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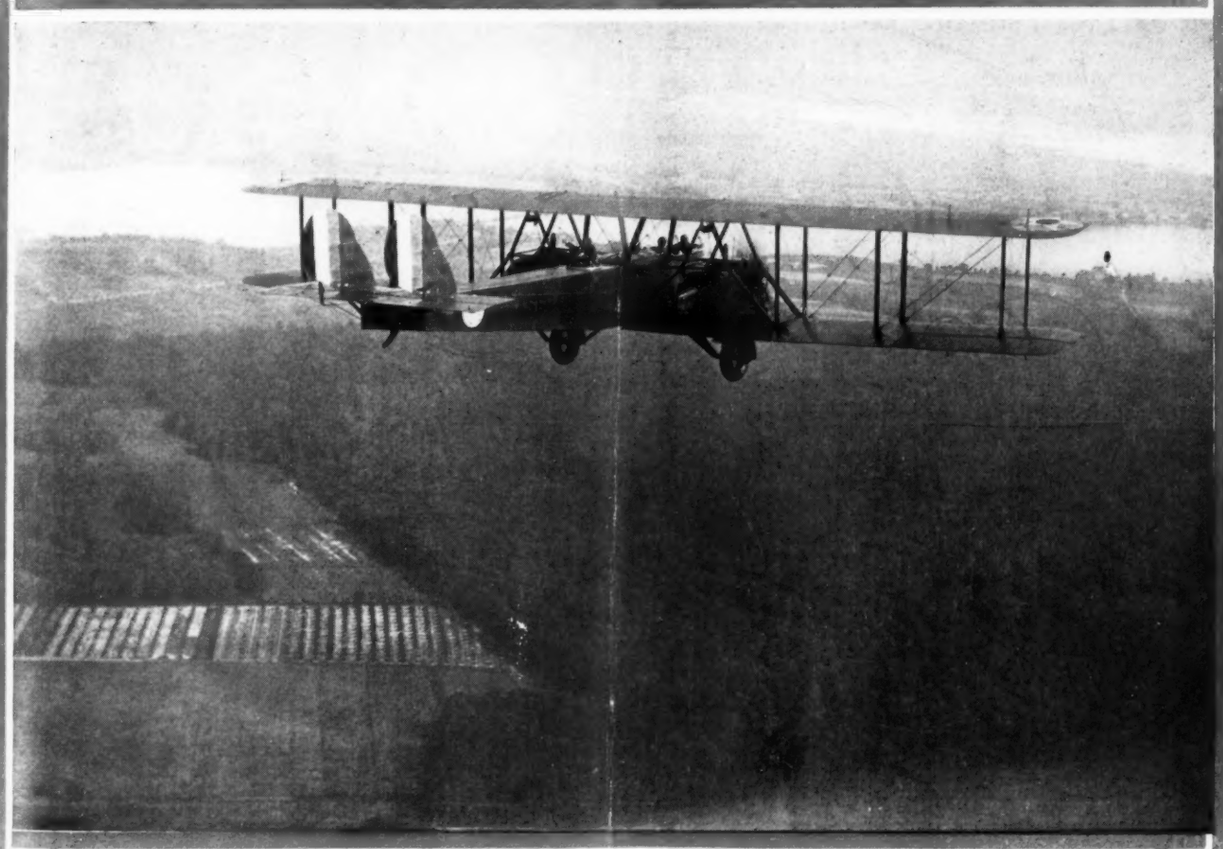

R.O.T.C. officers off for a long distance bombing expedition

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VOLUME XXII

NUMBER 5

SPECIAL FEATURES

HOW MANY COMMERCIAL AIRPLANES BUILT IN 1926?
THE COST OF OPERATING THREE-ENGINE PLANES
THE AIR CORPS UNIT AT N. Y. UNIVERSITY

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HIGHLAND, N. Y.
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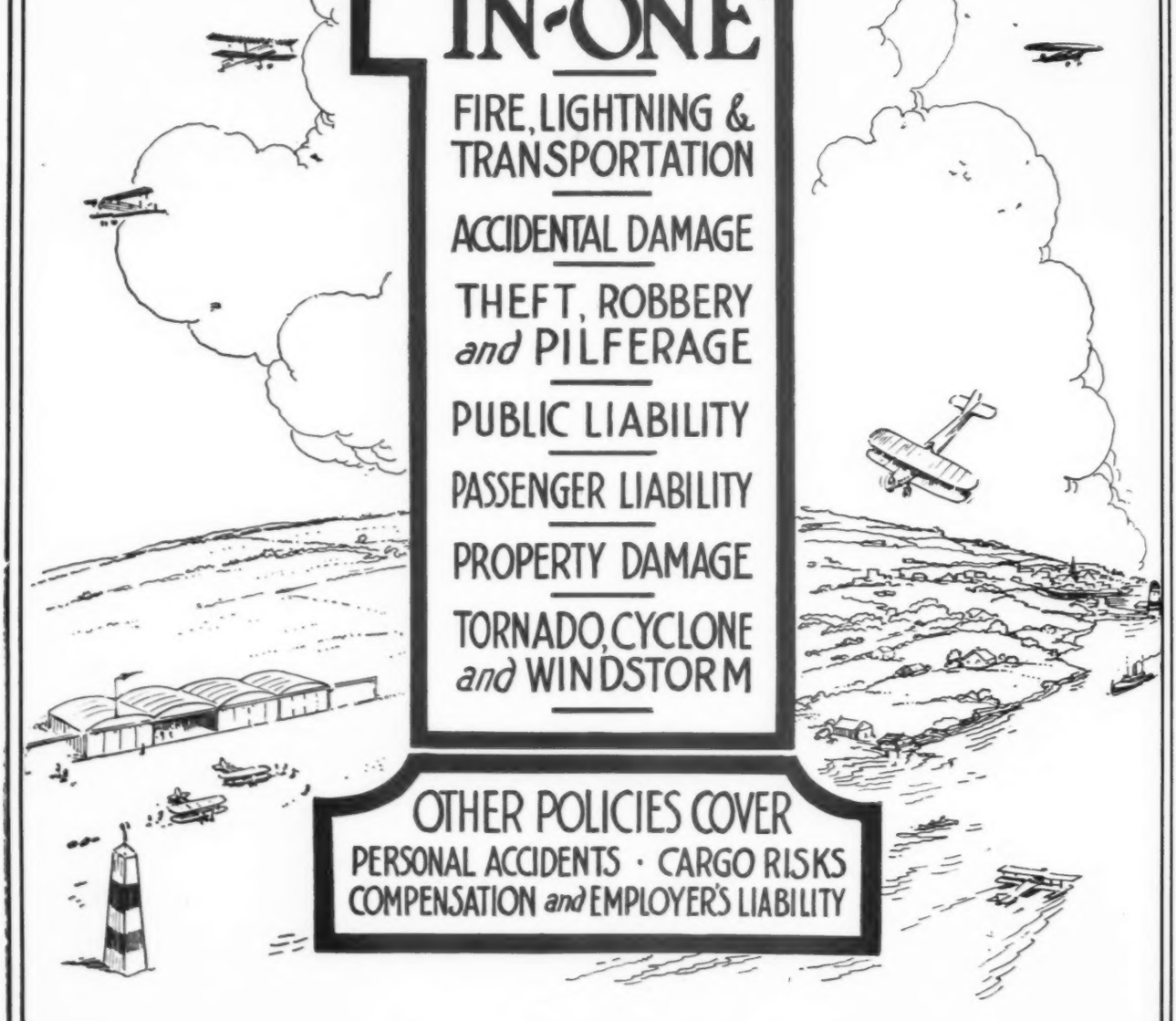

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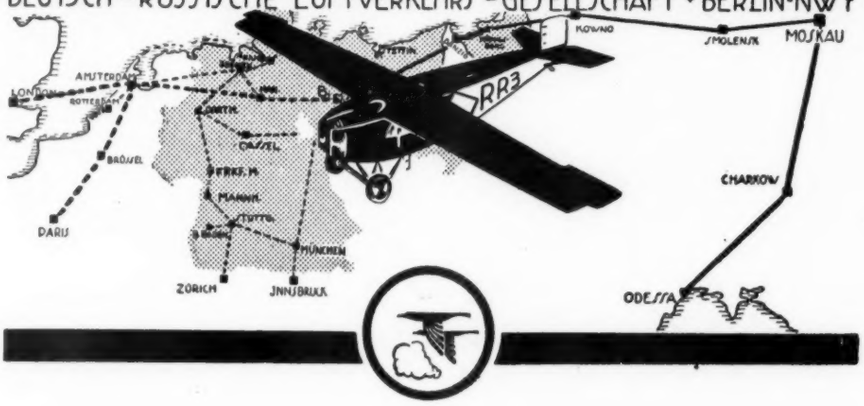

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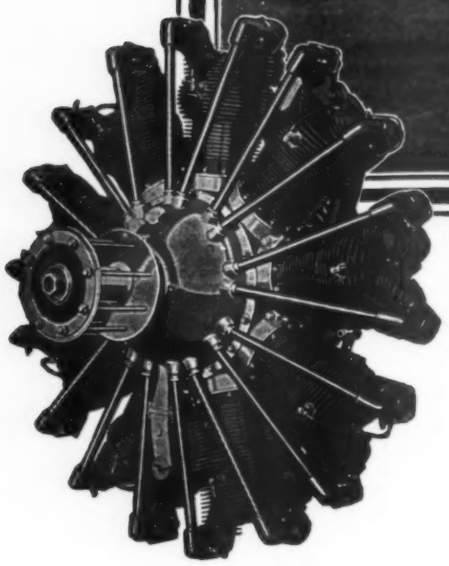

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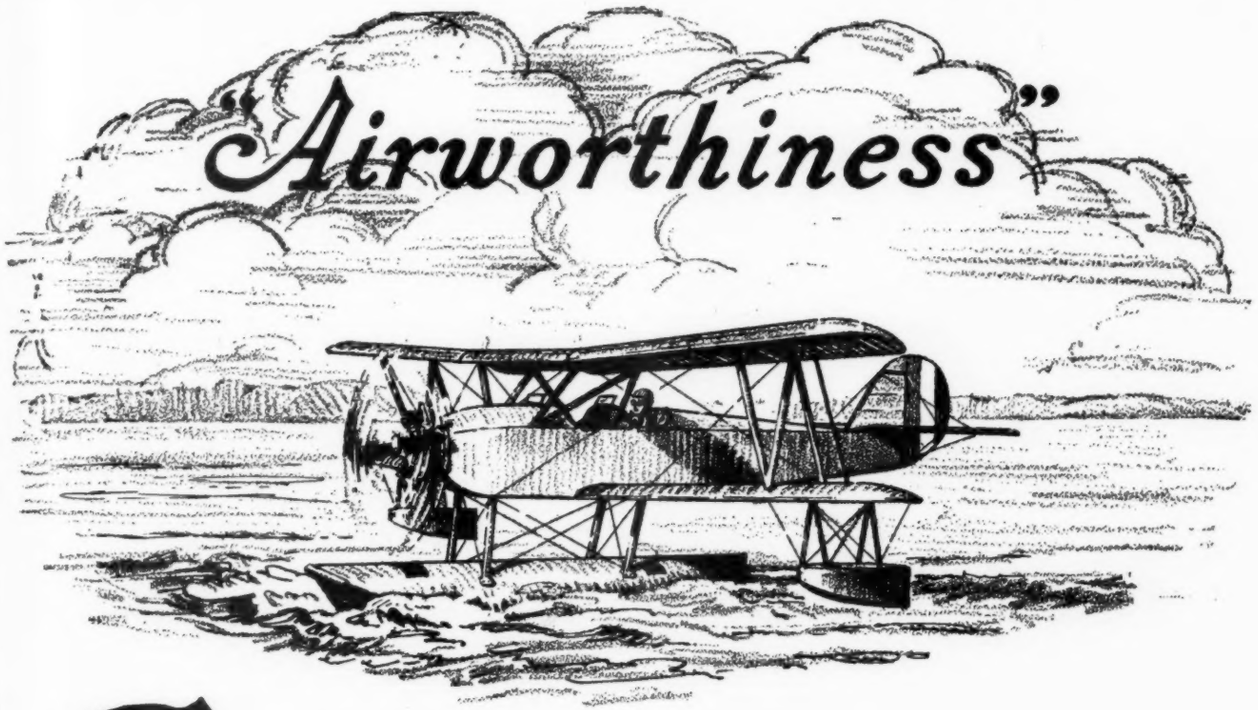

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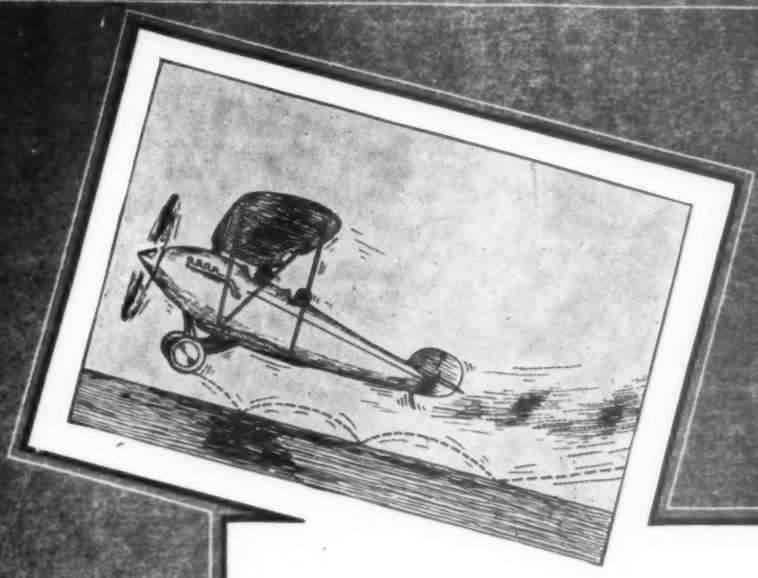
With the Editor

Lamentations regarding America's position relative to other countries in the development of commercial aviation are now seldom heard. The American public is beginning to realize that this country has developed commercial aviation to a similar extent even if along different lines from the development abroad, but there is no doubt that the feeling is prevalent that our commercial aviation is far less spectacular than is the civil aviation in Europe. Even those closely acquainted with aviation in this country undoubtedly have this feeling. But we only have to glance down the figures published in this issue of the number of newly designed commercial aircraft produced during 1926, to revise completely our ideas on this subject.

All these planes have been produced for private ownership and commercial flying unassisted by any Government activity. As brought out elsewhere in this issue, the Aeronautics Branch, Department of Commerce, is making good headway with the job of lighting the airways throughout the country and in Washington considerable experimental work is being carried out in the development of the radio beacon. With all this real encouragement we fully expect to be able to publish even more startling figures of aircraft products at the conclusion of 1927.



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In 1926
WRIGHT WHIRLWIND ENGINES
Flew More Than
1,750,000 MILES
In Commercial and Private Airplanes

Whirlwinds Have In 1926;

In Competition

Made first North Pole flight by Commander Richard Byrd in Fokker 3-engined plane.

Won 1st place Annual Reliability Tour of 2,555 miles in TravelAir plane carrying 600 lbs. pay load, average speed 124½ m.p.h.

Won 2nd Place Annual Reliability Tour in Buhl Verville Airster carrying 800 lbs. pay load, average speed 113.5 m.p.h.

Won 3rd Place Annual Reliability Tour in Stinson "Detroiter" carrying 640 lbs. pay load, average speed 106.7 m.p.h.

Won Transport Race for Detroit News Air Transport Trophy at Philadelphia in Wright Bellanca carrying 1,607 lbs. ballast at 121.53 m.p.h.

Won Light Commercial Race at Philadelphia carrying 1,145 lbs. ballast at 121.36 m.p.h.

Won 12 out of 18 prizes they competed for at Philadelphia.

Won 3 First Prizes at Denver Mile High Air Meet in Ryan M-1.

Made Non-stop Portland, Oregon to Los Angeles flight 1,050 miles 9 hrs. 20 min. in Ryan M-1 Monoplane of Pacific Air Transport.

Carried 2,666 lbs. pay load at Philadelphia at 114.99 m.p.h. in the Stout 3-engined airliner built by the Ford Motor Company.

In Daily Service Flown for

Philadelphia Rapid Transit Company—339,950 engine miles with $75.55 cost of engine parts averaging 10½ gal. fuel per engine hour on their 255 mile route—Philadelphia, Washington, Norfolk, using 12 WHIRLWINDS exclusively in Fokker planes.

Varney Air Mail Service—172,080 miles with $78 cost of engine parts on their 520 mile route across the Rocky Mountains from Salt Lake to State of Washington using 7 WHIRLWINDS exclusively in Swallows.

Colonial Air Transport—89,000 miles with $225 cost of engine parts on their 192 mile route New York to Boston, using 4 WHIRLWINDS exclusively on this route in Fokker and Curtiss planes and 3 in their Fokker Airliner.

Pacific Air Transport—251,700 miles on their 1,121 mile route Los Angeles to Seattle using 8 WHIRLWINDS exclusively in Ryan and Travel Air planes.

Northwest Airways since October—39,600 miles on their route 377 miles Chicago to St. Paul using WHIRLWINDS exclusively in Stinson "Detroiters."

National Air Transport—30,980 engine miles as part equipment for their 987 mile route Chicago to Dallas in Travel Air, Ford—3-engine plane and Wright Bellanca.

Florida Airways—74,690 miles, as part equipment, on their 683 mile route Atlanta to Miami using 4 WHIRLWINDS in Stinson and Curtiss planes. Carried $2,000,000 currency into Miami from Atlanta the day after the hurricane, in Stinson "Detroiter".

Canadian Air Express 40,590 miles on their route at Red Lake, Canada, using 3 WHIRLWINDS exclusively in Stinson "Detroiters" and Curtiss Larks.

Huff-Daland Dusters, Detroit Arctic Expedition, Charles Dickinson, Henry Dupont of Wilmington and Pontiac, Canadian and American Fairchild Company, Bennett & Rodebaugh of Alaska, Central Canada Airlines, Frederick Ames of Boston and many others.

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AVIATION

The Oldest American Aeronautical Magazine

VOL. XXII JANUARY 31, 1927 No. 5

An Unjust Rule

THE CREDITING to the United States of the records made at Norfolk at the time of the Schneider Trophy Race by Major de Bernardi, the Italian pilot in an Italian seaplane, powered with an Italian engine is not only unjust to our sportsmanlike competitors but creates an embarrassing situation for America. The rules of the Federation Aeronautique Internationale give to the country where a contest is held or starts the honor of the victory regardless of the nationality of the pilot or the aircraft.

The protest to be made by the National Aeronautic Association against this absurd situation will be heartily applauded by every American airman and unanimously supported by the public.

Before a decision is reached correcting this technicality, responsible persons in this country should do everything within their power to make our Italian friends feel that our sportsmanship is worthy of the gallant effort they made. The acceptance of the record can be refused and a protest made against placing it in the list of American achievements.

The F.A.I. may have had excellent reasons for adopting this rule but it has been ill advised. If, in the future, American pilots and American aircraft making records in other countries of the World do not bring them to this country, there will be little or no incentive to enter in races abroad in the future. We salute our recent Italian guests and hope that the injustice will be quickly made right.

The Seaplane in Commercial Air Transport

FOR REASONS into which it is not necessary to enter at this time, the seaplane, and particularly the large flying boat, has not been developed for commercial air transportation to the same extent as has been the airplane. While it is true that certain individual air transport services have been and are still being operated with seaplanes, both of the pontoon and of the flying boat type, it may safely be said that the airplane is the most common type of aircraft employed in air transportation operations. Viewed from the standpoint of geography this is somewhat curious in view of the fact that by far the larger part of the Earth's surface is water and it would seem justifiable, therefore, to expect water to be under an aircraft more frequently than land. It should be remembered that aircraft are only concerned materially with the type of terrain flown over when it comes to having to make a landing.

Yet, in spite of this apparent neglect of the seaplane in air transport fields, incidences are frequently cropping up to draw attention to the possibilities of the large seaplane in commercial aviation. Recently, two French fliers, Lieutenants Bernard and Gilbaud, left Etang de Berre, near Marseilles, France, for Madagascar, the French colony island off the coast of South Africa, in two Liore et Olivier six-passenger cabin flying boats with single 420 hp. Jupiter engines. Lieutenant Gilbaud was unfortunate in experiencing trouble during the first thousand miles or so but Lieutenant Bernard continued the flight, arriving eventually at Majunga, Madagascar, and has since returned to French East Africa.

The significant feature of this flight of approximately 20,000 miles in all is that a normal flying boat was employed in spite of the fact that the route lay clear across central Africa. Leaving Marseilles, the East coast of Spain was followed, and the Northwest coast of Africa as far down as St. Louis, on the Senegal coast. Thence, Lieutenant Bernard turned inland and followed the Senegal and Niger rivers to Timbuctoo, Soudan, turning South to Lokoja near the mouth of the Niger River. The interesting point here is that the distance covered between St. Louis and Lokoja by the inland route was approximately no less than the distance along the coast line, yet the pilot chose the inland route even though he flew a seaplane.

While a close inspection of the map does reveal minor rivers between Lokoja and the next stop, Archambault, it is very evident that this leg of the flight, nearly 1000 miles in length, was cross-country in every sense of the term. From there on across the Equator the Congo River was followed until the lake region of Tanganyika and Nyassa was reached. Prior to this it is interesting to note that Lieutenant Bernard in his flying boat was for hundreds of miles of his flight at least 1000 miles from the nearest coast.

The possibilities suggested by a flight of this nature are enormous. The Liore et Olivier is by no means a small seaplane, yet it is apparently possible to fly a machine of this class over long inland routes without danger. A seaplane operating along a route following the natural waterways of a country does not need specially prepared fields and emergency fields spaced every 25 miles or so. All the expense of this part of the ground equipment is dispensed with. The Scadta air service along the Magdalena River of Colombia is proving this. It would seem, therefore, that with the design of seaplanes, probably of the flying boat type, capable of economic operation, their employment in inland air transportation seems a real possibility. Even assuming that the basic design of a flying boat is such as to prevent its ever becoming as economic an air carrier as the airplane, it is reasonable to expect that the saving in ground equipment might counterbalance added costs in other directions.

A Heavy Oil Substitute for Gasoline

A Non-Inflammable Fuel Undergoing Tests in France.

A RUSSIAN ENGINEER, called Makhonine, appears to have developed a fuel engine which will not burn under normal atmospheric conditions and which can be substituted for gasoline with only slight changes in carburetor adjustments. Mr. Makhonine has been negotiating with the French Government for the purchase of the rights to the fuel and, as all tests have been made by the Government, little specific information is available as to the process of manufacture or the cost. It is known however that automobiles, trucks, "sub chasers", airplanes and flying boats have all been operated on the fuel and appeared to developfull power. The main basis of the new fuel is coal tar which is a by-product in the manufacture of illuminating gas and coke from coal. This is especially important to France, as she is dependent on outside supplies for aviation fuel. To the rest of the World the main advantage of the new fuel is the fact that it will not burn in case of a crash and that the plane cannot catch fire in the air.

Astonishing Trials

The experiments have been going on for a long time and announcement of the new fuel was made by the press in 1924. The French Government seems to have delayed for one reason or another giving the fuel a thorough test and even now there is no official announcement. The only data which is available is from news reporters of good repute who have followed the development. In February of 1926 Georges Leygues, Minister of the Marine, became interested in the fuel and sent a delegation to visit the factory. The process of manufacture is not described but it is stated that 90 per cent of the primary material is converted into the new fuel. During the tests a small fire was built and a bucket of the new fuel was used to extinguish it. Some of the fuel was spilt on the floor and a lighted rag soaked in gasoline was applied without causing a fire. When the official visitors left they themselves emptied their car of gasoline and filled it with Makonine's fuel. On their return to Paris they stated that the car had run better than with gasoline.

In February, 1926 a "sub chaser", which had three engines totaling 750 hp. was supplied with the new fuel and out ran another "sub chaser" of the same type which was using gasoline. To be certain that there was no cheating the checking officials drained some of the fuel from the carburetor and tried to ignite it but failed. The "sub chaser" was ordered to operate for six months on the new fuel and apparently has done so with success.

The fuel has also been tried extensively in motor trucks and the auxiliary air heater, with which their carburetors had previously been fitted, was found to be unnecessary.

Airplane Engine Tests

On July 7 representatives of the Ministry of the Marine gave out the following statement on the tests of a 180 hp. Hispano-Suiza engine which was run on the bench.

"All the tests were made without the auxiliary air heater, which Mr. Makhonine had built for the engine, and which is to be installed in the F.B.A. flying boat.

"The first tests were run with the same carburetor adjustment which was used for gasoline. The engine started but did not develop full power and most of the morning was spent in obtaining the proper mixture. In the afternoon, starting and power tests were run with the mixture obtained in the morning. The engine was started cold with an Odier starter and booster magneto. The rated 180 hp. was easily reached and the engine developed up to 191 hp.

"The functioning of the engine throughout the three hour test was excellent both with the engine throttled and at full power. When throttled the engine ran very smoothly. At the end of the test, oil was taken from the crankcase and was found to have lost none of its lubricating qualities and to have no trace of the fuel."

In July an old type 150 hp. Hispano-Suiza engine, which had had 60 hr. since overhaul, was run for 65 hr. more with the new fuel. On July 28 it was installed in the F.B.A. flying boat. The first tests were not very successful but it was found that the gas line had become blocked. After this had been cleaned out the plane flew perfectly. The officers who made the tests stated that with a proper mixture there was no fouling of plugs and that apparently less carbon formed than is usual with gasoline. Other planes stationed at Cherbourg were also flown with the new fuel, notably a Latham, two planes with 300 hp. engines, an F.B.A. boat also with a 300 hp. engine and a Tampier.

The accounts of the tests seem to bear the stamp of truth and delays in the Government's adoption of new ideas have been heard of before. If the fuel is what is indicated by the tests it will certainly be the greatest boon that has come to aeronautics in a long time. The fire hazard both in flight and after a crash has added greatly to the percentage of aviation fatalities and to the fear that people have of the air. The French government owns all the rights to the fuel but it is hardly conceivable that they could keep such a discovery to themselves.

Since the preparation of this article further confirmation of the qualities of the fuel have come through tests conducted at Le Bourget. A Farman Goliath was flown with the new fuel supplying one engine and gasoline the other. A Spad with a 260 hp. Salmson engine was also flown for several hours. It was found that the jet needed to give the proper mixture for the new carburant was somewhat smaller than that needed for gasoline. The fuel poured on a red hot exhaust pipe (950 deg. centigrade) did not catch fire. On the other hand, however, cloth soaked in the fuel would burn in a fashion similar to a wick soaked in kerosene.

Air Mail Closes Year with Records

Pilots of the United States Air Mail Service shattered many speed records during the year just closed. Statistics on file at the Post Office Department show that on Dec. 16, last, the eastbound trans-continental planes broke three speed records between Chicago and New York. Pilot Jack Milatzo on this date flew from Chicago to Cleveland, 327 miles, in 1 hr. and 59 min., or at the rate of 164.8 m.p.h. The best previous time was 2 hr. and 2 min.

Pilot Harry Chandler flew from Cleveland to New York, 299 miles, in 2 hr. and 21 min., or at the rate of 169.7 m.p.h. The best previous time was 2 hr. and 30 min.

The flying time on this same date from Chicago to New York was 4 hr. and 20 min., or at the rate of 167.3 m.p.h. The best previous time for this trip was 4 hr. and 35 min.

The comparative speed records made during the month of December, 1926, and December, 1925, between different air mail stations are as follows:

New York to Cleveland—1926—2 hr. and 21 min.; 1925—2 hr. and 52 min.

Cleveland to Chicago—1926—1 hr. and 59 min.; 1925—2 hr. and .07 min.

Chicago to Omaha—1926—2 hr. and 50 min.; 1925—3 hr. and .04 min.

Omaha to Cheyenne—1926—3 hr. and 20 min.; 1925—3 hr. and 20 min.

Cheyenne to Salt Lake City—1926—2 hr. and 40 min.; 1925—3 hr. and .02 min.

Salt Lake City to Reno, Nev.—1926—3 hr. and 27 min.; 1925—3 hr. and 47 min.

Reno to San Francisco—1926—1 hr. and 36 min.; 1925—1 hr. and 28 min. Changeable winds affected the time on this route.

The Fliers' Aspects of Aerography

The Shenandoah and the Squall.

By PROF. ALEXANDER McADIE,
Director, Blue Hill Observatory

ON THE morning of Sept. 3, 1925, the U.S.S. Shenandoah, Daughter of the Stars, was proceeding westward over southeastern Ohio, when she ran into a squall; a minor atmospheric disturbance, in which air streams of comparatively small cross section and moderate length but high velocities developed intermittently, are in violent commotion. In other words, there are sharply defined limits and discontinuities of momenta. These air streams are not straight lined, but, for the most part, curvilinear. One can see these larger whirls in miniature on a gusty November day, when wintry winds whirl the dry leaves or scraps of paper and straws.

Structural Strains

The matter of structural strains and the ability of a well designed airship to withstand such strains are engineering matters; but the second part of the question can, we think, be answered in the affirmative. The opinion of the Court of Inquiry is perhaps best summed up in these words:

> "Although the disaster to the Shenandoah indicates that a rigid airship can probably be destroyed through external dynamic forces only, and that such forces can arise from air currents unaccompanied by visible signs recognizable by aerographers, *in the present state of knowledge* (italics ours) it is the opinion of the Court that *such conditions and combinations of circumstances are unusual,* (italics ours) and such a conclusion does not therefore throw doubt upon the safety and utility of rigid airships to a materially greater degree than does the fact that other types of craft for navigation in the air or on the water are likewise subject to destruction through unusual dangers which cannot invariably be foreseen and provided against."

We have italicized certain parts of the opinion, for it is the purpose of this paper to try to point out certain advances in our knowledge, enabling air officers on watch to detect at an early stage the likelihood of formation of these adverse and destructive conditions.

Conditions at the Start

The Shenandoah left the mooring mast at Lakehurst at 2:52 p. m. Sept. 2, 1925. The weather report based on observations made at 8 p. m. received, mapped and studied, and up to midnight there was no thought of danger.

At 3:56 a. m. (90th Meridian Time) Thursday, Sept. 3, the ship was between Cambridge and Byesville, Ohio, the course having been set from Wheeling for Byesville. From this time on, the Shenandoah made but little progress West. It is a common belief that big airships can make headway against winds of 50 m.p.h. but it is a matter of record that the Shenandoah while on the California Coast, especially in the vicinity of Pt. Reyes, was brought to a standstill by winds of about 50 m.p.h. The ship's pressure height was a little over 1100 meters (3600 ft.)

After crossing the Alleghanies without incident, for there was sufficient air room, a thunderstorm was noticed ahead and the course changed South to avoid it. About 3:30, the course was resumed as the storm then appeared to be in the North and East. The ship made no headway but drifted steadily to the North. A streaky cloud appeared on the starboard bow, and the ship started to rise. Efforts to check the rise were not successful. The rate of ascent was 2 meters per second and was increasing. Gas was valved and the usual precautions taken to prevent too much momentum in the downfall. The ship straightened out for a few minutes but, after that, continued to rise. Now, this upward current was significant. It meant that the ship was already in the upward rush of incoming air on the South edge of a squall.

It is our opinion that the situation was already critical. The best course of action would have been to let the ship rise, not lightening too much, and to keep all engines going, with the ship heading to the Southwest but turning to the South as fast as conditions permitted, thus ultimately running away from the storm to the Southeast. When assured that the ship was beyond the vortex effect, the course might then be laid to the West and so come around in the rear of the storm. No one can justly criticize the decision of the Commander, or the way in which the ship was handled, in view of the data then in his possession. Today it would be different. We now know that a dangerous condition existed and might have been detected earlier—in fact, in time to get out of the danger zone.

The ship was provided with a combination barograph, thermograph and hygrograph. The elevation is obtained from the barograph, scaled to feet instead of reading in pressure

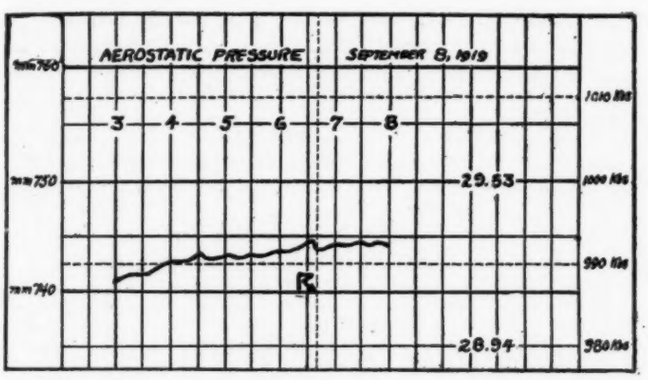


Fig. 1. Aerostatic Pressure During a Thunder-Storm

or force units. The so-called altimeter, however, is accurate only when the mean temperature of the air column is 10 deg. (283 deg. absolute). This was not the case as it was a moderately warm night and, even at a height of 1500 meters, the temperature was well above 290 deg. absolute. Therefore, all heights indicated instrumentally were lower by from 50 to 100 meters than true heights. This, however, was not important. The temperature curve and the humidity curve are of more importance, for they indicate a saturation load of 30 grams per cubic meter of space. Unfortunately, there are no means of detecting true lapse rates for any given stratum the ship may be traversing. Possibly there was an inversion on this night. There is, at present, no way of using the indicator diagrams of Sir Napier Shaw—the so-called tephigrams giving the relation of any sample of air to its environment. These indicate the transformation of energy of a kilogram of dry air saturated with water vapor, which passes through a series of operations. Nor are there any instruments for indicating the difference in angle between surface winds or low strata winds, and direction at higher levels. Also, the air navigator has no electrical indicators, meaning thereby instruments that would give him some knowledge of the increase of electrical strain between cloud and earth.

The surface winds were Northeast indicating that the core of the vortex was farther South than the southerly winds at the ship's level would indicate. It is plain that there were conflicting currents. It was known that a fairly well deve-

loped "low" was over the Missouri Valley moving to the Southeast, for a weather map was drawn on the ship slightly before midnight, giving the conditions three hours earlier. It was a map which, as we now know, misled those on board. With a barrier of high pressure to the East overlying the Ohio Valley, there was developed a southerly elongation of the zone of instability. In that area, one must expect thunderstorms and squalls. Whirls that are only ten to twenty miles in diameter would develop, and, while an airship might possibly ride safely through the intervening areas of stable atmosphere, it would be a dangerous undertaking.

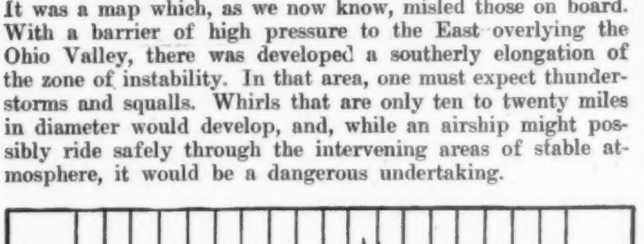


Fig. 2. Aerodynamic Pressures in a Squall. Kilobars x 10 = Kg./sq. meter. Kilobars ÷ 0.48825 = lb./sq. ft.

The Shenandoah was not equipped with a proper outfit for aerographic purposes. As stated above, a combination aerograph gave humidity, temperature and pressure, but on such a small scale that, even when magnified, no fine details could be brought out.

Unstable Air Conditions

Two illustrations (Figs. 1 and 2) herewith show, in a general way, what happens when the air is in an unstable state. Fig. 1 shows the change in aerostatic pressure. It will be noticed that there is a decided jolt in the curve as the thunderstorm passes and also there is evidence of instability during the preceding hour. It was not possible for the aerographic officer aboard to detect from his instruments the likelihood of trouble. Fig. 2 shows the change in aerodynamic pressure with the passage of the storm. Herein lies the information which engineers must have if they are to estimate, with any degree of accuracy, the strains due to aerodynamic forces.

It was a matter of vital importance, as the events proved, to know if the thunderstorm front was approaching. We are not aware that any mention was made in the Court of Inquiry of the possibility of obtaining, by a radio detector, the distance and intensity of the lightning discharges. Doubtless in all present airships, attention is given to this; but as conditions were on the Shenandoah, such information furnished to the aerographic officer at an early hour, might have saved the ship.

About 3:30 a.m. detached clouds were noticed forming in the North and Northwest. Then, later, a solid sheet thickening into rolls, indicating squall conditions. A little later the ship was caught in an up-rushing air stream. The ship was not struck by lightning. We are of opinion, however, that an electrometer sufficiently sensitive, would have indicated increasing potential differences.

In addition to the up-rushing air stream, there was rotation around a horizontal axis, and so the ship rolled badly. The effort to keep the ship on an even keel and at a fixed height caused tremendous strains on the structure. It would be hard to know what to do at such times, because the forces acting are spasmodic and intermittent. Hence, when the ship is suddenly relieved of an upward acceleration, the opposing forces called into play, meet no resistance and the ship is suddenly accelerated in its downward flight.

Here is a fundamental difference between the navigation of an airship and a steamship. No blame can attach to the commander of the Shenandoah, however, for either valving gas on the one hand, to keep under his pressure height, or, on the other hand, for slipping his fuel tanks to prevent crashing—for this last seemed imminent. Then came the third accelerating gust, causing the ship to spin, and the breaking away of the control car.

At present, we cannot say whether this was the same air current which caused the earlier rise or another stream. The ship was light and was easily tossed upward at a speed of perhaps 10 meters per second (22 m.p.h.) to a height of 1850 meters. Then came a rapid descent. Under earlier strain, wires had parted; and soon the ship broke while spinning counter clockwise.

A Mail Pilot on Aerography

The articles appearing in recent issues of AVIATION on "The Fliers' Aspects of Aerography" have brought the following observations from Rexford B. Levisee, an air mail pilot on the Western Division, Trans-Continental Air Mail Service:

"The Fliers' Aspects of Aerography", written by Professor McAdie, has convinced me that an air mail pilot is familiar with these phenomena and their physical strength.

The heavy thunder cloud, with wisps of vapor and water falling out of it, and the occasional presence of lightning, is of great electrical capacity, and is usually surrounded by powerful air currents. Although there are no electrical discharges, the rushes of air are even.

Two close thunder clouds, with a partially clear space intervening apparently from a condenser, and produce air currents which are very dangerous. The downward flash of lightning, which is always the fastest, is preceded, accompanied and followed by a quick and powerful column of air. These rushes of air would completely demoralize the flight of a pilot under full power.

The air in advance of a moving thunder cloud is compressed and follows the general direction of the cloud movement, excepting that portion at the forward edge, which is usually very gusty. This is fair flying air. The air close to the margins of the clouds permits of easy climbing, but a dangerous downward current is usually present at the rear, especially if there is a hard downpour of rain. A plane should always keep clear of this position at least four miles. I have personally encountered a 2,400 ft. vertical drop two miles in the rear of a thunderstorm, the cloud measuring about 2,000 ft. in depth, 15 mi. in length, and 3 mi. in width. with a speed of 6 m.p.h.

I believe a partial solution of the problem surrounding the rush of water to the ground during a lightning flash is to be found in the compression of the surrounding air and its terrific downward force and speed. The condensation of the air and its downward rush is almost completed before the visible discharge. It is possible, however, that the rush of air occurs in advance, causing the condensation and discharge.

These phenomena present in clouds, lightning and fast moving columns of air are of great power and should prove very interesting for further study.

I would like to become familiar with this question by means of flying, instruments, smoke bombs and photographs.

Air Mail Receipts

The total gross air mail receipts for all routes during the last 6 months of 1926 were:

July	$73,137.45
Aug.	78,275.56
Sept.	82,769.59
Oct.	90,906.10
Nov.	100,958.30
Dec.	121,727.10

indicating an increase from $73,137.45 to $121,727.10 on 66 2/3%, for the period of 6 months.

How Many Commercial Aircraft Built in 1926?

First Figures to Show Production in U. S. of Airplanes for Commercial Purposes

IN 1926, the manufacturers of commercial aircraft made great progress. Not only were many new types produced but the constructors of the year before went into production on a small scale. In 1927, there ought to be double or treble the commercial types manufactured as were produced last year.

In reply to a letter asking for the number of newly designed commercial airplanes that were in use on Jan. 1, 1927, and how many were made in 1926, there were received some very interesting replies. Some of the companies did not give complete figures but it is believed that, for general purposes, the following list will give an idea of the commercial aircraft development in the United States in respect to new types.

NAME	PLANE	TOTAL NO. IN USE JAN. 1, 1927	MANUFACTURED 1926
Advance Aircraft Co.	Waco	356	200
Alexander Aircraft Co.	Eaglerock	40	50
Swallow Mfg. Co.	Swallow	85	40
Atlantic Aircraft Corp.	Fokker	18	13
Douglas Airplane Co.	Douglas Mail Plane	60	60
Buhl Aircraft Co.	Airster	5	5
Travel Air, Inc.	Travel Air	56	64
Stinson Aircraft Corp.	Detroiter	10	10
Sikorsky Mfg. Co.	Sikorsky	5	2
Fairchild Airplane Mfg. Co.	Fairchild	1	1
Ford Motor Co.	Ford	10	3
Huff Daland Airplanes, Inc.	Petrel	19	3
Ryan Airlines	Ryan	6	6
Curtiss Aeroplane & Motor Co.	Oriole	30	0
	Carrier Pigeon	10	10
	Lark	5	5
	Seagulls	20	—
Pitcairn Aviation Co.	Fleetwing, Orowing	6	12
Woodson Engineering Co.	Woodson	6	14
Wright Aeronautical Corp.	Wright-Bellanca	1	1
American Eagle Aircraft Co.	Eagle	6	6
Driggs Aircraft Co.	Dart	3	1
Heath Airplane Co.	Tomboy, Parasol, Favorite	3	2
Cole Aircraft Corp.	Sport Commercial	4	4
Eberhart Steel Products Co.	Commercial	1	1
Edo Aircraft Corp.	Malola	1	1
G. Elias & Bro., Inc.	Elias Air Mobile	2	1
Hess Aircraft Co.	Blue Bird	—	2
Irwin Aircraft Co.	Meteorplane	7	4
Johnson Aircraft Corp.	Twin-60	1	1
Kentucky Airplane Co.	Cardinal	2	4
Kirkham Products Co.	Bonney Gull	—	1
Kreider-Reisner Aircraft Co.	Midget	5	5
Lincoln Standard Aircraft Corp.	——	395	79
Montee Aircraft Co.	Montee	—	2
Waterhouse Aircraft, Inc.	Cruizair, Roamair	—	2
Western Airplane Corp.	King Bird	1	1
Ireland Aircraft	Meteor, Comet	10	10
E. M. Laird Airplane Co.	Commercial	6	6
Kinner Airplane & Motor Co.			
Yackey Aircraft Co.	Yackey Transport	4	3
Anderson Aircraft Co.	Yackey Cruiser	—	1
		1200	636

In the compilation of this table an endeavor has been made to include only newly designed aircraft to the exclusion of all other planes and where spaces have been left the figures have not been found available. The figure of 636 newly designed airplanes constructed during the year 1926 is extremely significant of the development of the commercial aircraft industry in the United States during the past twelve months.

The France-Madagascar Flight

Lieutenant Bernard, of the French Navy, reached the port of Bizerta, on the African coast, Jan. 12, after completing a flight to over 20,000 miles, in a seaplane, in the flight from France to Madagascar and return.

The plane used in the flight was a Loire et Olivier, powered with a Gnome-Rhone Jupiter 420 hp. engine. The flight started Oct. 18. The route of the seaplane followed rivers and lakes across the African continent.

Nineteen Year Old Boy Designs Plane

Louis H. Brown, of Toledo, Ohio, at the age of nineteen, has designed a plane which has been successfully flown by himself and other pilots.

The fuselage of this plane, which is a cabin machine, is built of ash longerons, wire braced from the engine compartment to the tail. The engine mount is of steel tubing and the radiator of the tunnel type is below the engine. All the cowling can be taken off quickly. The cabin and the pilot's cockpit are lined with Haskelite. The finish is in mahogny. The entrance to the cabin is through a side door that swings out, and a double folding top that swings up and over to the opposite side of the door. A baggage compartment, which can be locked, is arranged in the turtleback.

The wings are of conventional construction, the spars being routed "I" beams and the ribs made of 3/8 in. square spruce, trussed according to the Warren system, with 1/16 in. plywood gusset planes. The engine is a 180 hp. Hispano-Suiza.

The specifications and performance figures as provided are as follows:

Span	36 ft. 4 in.
Chord	72 in.
Gap	75 in.
Length	27 ft. 6 in.
Height	10 ft. 4 in.
Wing area	402 sq. ft.
Aileron area	48 sq. ft.
Weight empty	1700 lb.
Pay load	700 lb.
Total weight loaded	2948 lb.
Landing speed	43 m.p.h.
High speed	95-100 m.p.h.
Climb	600 ft. per min.

The Brown cabin commercial plane (180 hp. Hispano-Suiza). No details are given as to the number of passengers carried in the cabin.

Department of Commerce Lights Civil Airways

Contract Air Mail Routes Almost Completely Lighted By 1928

THE AERONAUTICS Branch, Department of Commerce, under the Assistant Secretary of Commerce for Aviation, William P. MacCracken, Jr., is very rapidly pushing ahead with the work of lighting the airways of the United States to permit the mail on the contract air mail routes and other air transportation over these routes to be carried on at night and thus bring the advantages of the air method of transport up to their maximum value. The first airway beacon set up by the Federal Government under the provisions of the Air Commerce Act of 1926 was lighted on Dec. 7, 1926. It is designated beacon No. 71 and is located 15 miles Northeast of Moline, Ill. on the Chicago-Dallas route. By the end of this month, January, according to plans, 501 miles of this route, which is the N.A.T. Air Mail route, should be lighted. The lights are being installed by the Limestone Products Co.

The work of installing lights has, however, not been confined to one locality only, the equipment of other routes for night flying having been carried on at the same time in order that it may be possible for all the contract air mail operators to consider night flying as part of their schedules as soon as practical. Thus, the lighting of the Boston-New York air way, including the lighting of emergency fields, is already completed. This route is 220 miles in length and extends from the Boston Airport to Hadley Field, New Brunswick, N. J., which is the Eastern terminus of the Trans-Continental Air Mail Service.

Other Routes Being Lighted

Another route which is receiving immediate attention is that from St. Louis to Chicago. The equipping of this route for night flying is being carried out by the Robertson Aircraft Corp., the air mail contractor over the route. The distance is 277 miles and will include twenty-four revolving beacons, with nine lighted intermediate fields. The Varney mail route between Elko, Nev. and Pasco, Wash. is also receiving the attention of the Department of Commerce at this time. This route is 424 miles in length and lights are in progress of installation for 110 miles at the northern end of the route. When completed, this section of the Elko-Pasco route will be provided with one revolving beacon and twenty acetylene blinkers at approximately five-mile intervals between Coyote Hill and Pasco. No emergency fields are being lighted on this route at this time. Another western route upon which work is now in progress is that from Salt Lake City to Los Angeles, a distance of 589 miles. Air mail over this route is carried on contract by the Western Air Express. At the present time, this route will be lighted only between Las Vegas and Los Angeles, a distance of 278 miles.

Surveys have been completed on three other routes and these will be the next to receive the attention of the Aeronautic Branch. These are: the Chicago-Twin Cites route, 384 miles, of which 120 miles will be lighted; the Cheyenne-Pueblo route, 200 miles, of which 160 miles will be lighted; and the Detroit-Grand Rapids route, 140 miles, all of which is to be lighted. Whether this latter route will actually be lighted in the near future is not altogether certain.

The following is the lighting program under the appropriation for the fiscal year 1927:

Route No.	*Route*	*Route Miles*	*Miles Lighting*	*No. of Lights*	*No. of Lighted Intermediate Fields*
1	New York-Boston	220	220	19	4
2	St. Louis-Chicago	277	277	24	9
3	Dallas-Chicago	1000	501	72*	18
4	Salt Lake City-Los Angeles	589	278	20	7
5	Pasco-Elko	424	110	21**	0
9	Chicago-Twin Cities	384	120	under survey	
12	Cheyenne-Pueblo	200	160	under survey	
		3094	1666		

*Includes 5 revolving beacons and 30 gas blinkers installed by the air mail contractor.

**Includes 1 revolving beacon and 20 gas blinkers.

It is understood that the budget proposed for the fiscal year 1928 will probably admit of an additional 3200 miles of airway being equipped with revolving beacons and lighted emergency fields. If this program can be carried into effect the situation at the end of the fiscal year 1928 will be evident from the following details. The present air mail route system consists altogether of 8656 miles. The following figures are based upon this total mileage. It is, of course probable that by the year 1928 there will be many more miles of regular air routes to be lighted for night flying:

Present air mail system,		8656
Now lighted by Post Office,	2041	
Lighted by Commerce, 1927,	1666	
Lighted by Commerce, 1927 deficiency,	830	
	2496	
Lighted by Commerce, 1928	3200	
		7737
Unlighted balance of present system		919

24 in. Beacons

The equipment adopted by the Aeronautics Branch for the lighting of the airways is based, in the main, on 24 in. revolving electric beacons of 2,000,000 candle power, developed by the Sperry Gyroscope Company. These are placed on the average at approximate intervals of 10 miles with intermediate lighted fields at intervals of from 25 to 30 miles. Each of these fields will have either a revolving beacon located on the site or the field will be situated in the immediate vicinity of one of these beacons on the airway. The emergency fields, in addition, will be equipped with twenty white boundary lights, evenly arranged around the field. A green light will indicate the best approach and red lights mark obstructions in or about the field.

It should be remembered that it is not within the province of the Department of Commerce to equip the airports at the cities where stops are made, such being, in every case, a municipal undertaking. It is reported that many of the cities on the regular air routes are already improving their airports in line with the Department of Commerce activities and are installing lighting.

New Emergency Fields

Thirty-two new intermediate landing fields have been added to the list by the Department of Commerce in its surveys for lighting. These new fields are boundary lighted with white weather proof electric lamps. At one end of the best approach is a green light. As already stated, red lights mark all obstructions. Many fields have revolving beacons in the Northeast corner while the others are located as near the airway revolving beacon as is possible. Of course, these field lights burn all night as do all of the airway lights. At many fields caretakers are in charge and telephones are available at the homes of the caretakers as a rule.

The new emergency fields are listed herewith, by routes:

Boston-New York: Teterboro, Hasbrouck Heights, N. J.; Bethany, Conn.; Dudley, Mass.; Framingham, Mass.

St. Louis-Chicago: Godfrey, Ill.; Carlinville, Ill.; Lowder, Ill.; Mason City, Ill.; Pekin, Ill.; La Rose, Ill.; Tanica, Ill.; Morris, Ill.; Plainfield, Ill.

Dallas-Chicago: Arlington, Tex.; Slidell, Tex.; Muenster, Tex.; Punell, Okla.; Norman, Okla.; Edmond, Okla.; Perry, Okla.; Chillocco, Okla.; Unionville, Mo.; Bloomfield, Iowa; Fairfield, Iowa; Muscatine, Iowa.

Los Angeles-Salt Lake City: Verdemont, Cal.; Victorville, Cal; Lenwood, Cal.; Harvard, Cal.; Baker, Cal.; Mohawk Hill, Nev.; Jean, Nev.

A Novel Record

To the Editor of AVIATION:

The other day I was engaged to flight-test a Standard which had just been set up and upon checking it up I discovered it had a set of wings complete with wires and struts that I had flown on two other ships.

I have now flown these same wings on three different ships, an L-6 Standard, an OX-5 Standard, and a Hisso Standard. Sounds as if it might be a record. Do you suppose it is?

Walter William Meyer.

Guggenheim Fund Endows M.I.T.

Appropriates $230,000 For New Aeronautics Building To Be Completely Equipped for Instruction and Research

THE TRUSTEES of the Daniel Guggenheim Fund for the Promotion of Aeronautics have just announced a grant of $230,000 for the construction of an aeronautic building at the Massachusetts Institute of Technology at Cambridge, Mass. The announcement was made by Harry F. Guggenheim, president of the Fund just prior to his sailing for Europe to accept the invitation of the League of Nations to sit on a committee to investigate the relationship between civil aircraft and military air power, and it is understood that plans for the new building are already completed and that construction will start in the Spring.

The new building will conform to the general architectural lines of the massive structures which now constitute M.I.T. on the banks of the Charles River. At present the two wind tunnels which compose the aeronautical equipment of M.I.T. are housed in a temporary wooden structure standing out on the campus. These tunnels have already been described in AVIATION; they are of the venturi type with a circular section, one being 4 ft. in diameter at the working section and the other 7 ft. in diameter.

The Building Layout

The new building will be 150 ft. long and 60 ft. high with a high basement. The latter and first floor will be occupied by the wind tunnels. The first floor also will contain a working museum, library, drafting room, officers and locker rooms. On the second floor will be a large rigging laboratory, more drafting rooms and a research room. It is understood that the third floor will include two laboratories, one devoted to testing aircraft construction materials, and the other to flight test instruments, in addition to another drafting room and class rooms.

Appropriation of these funds to the Massachusetts Institute of Technology is the fourth grant made by the Daniel Guggenheim Fund to educational institutions in the United States. Last Summer the Fund gave approximately $600,000 to the California Institute of Technology and Leland Stanford University for the development of their aeronautical laboratories, both as to equipment and personnel. During the Fall, appropriation of $78,000 for the completion of the aeronautical laboratory and for the establishment of the Daniel Guggenheim Professorship of Applied Aeronautics at the University of Michigan was announced. Previous to the establishment of the Fund, Daniel Guggenheim gave $500,000 to New York University for the establishment of a School of Aeronautics.

In commenting upon the M.I.T. gift Dr. S. Stratton, president of the Massachusetts Institute of Technology, said: "The generosity of the Daniel Guggenheim Fund for the Promotion of Aeronautics now makes it possible to provide the much needed facilities for instruction and research in aeronautical engineering. The steady growth of aviation in this country, bringing with it a demand for engineers trained to meet new problems in construction and operation of aircraft, as well as constant research to add new knowledge to this branch of engineering, is sufficient evidence of its importance.

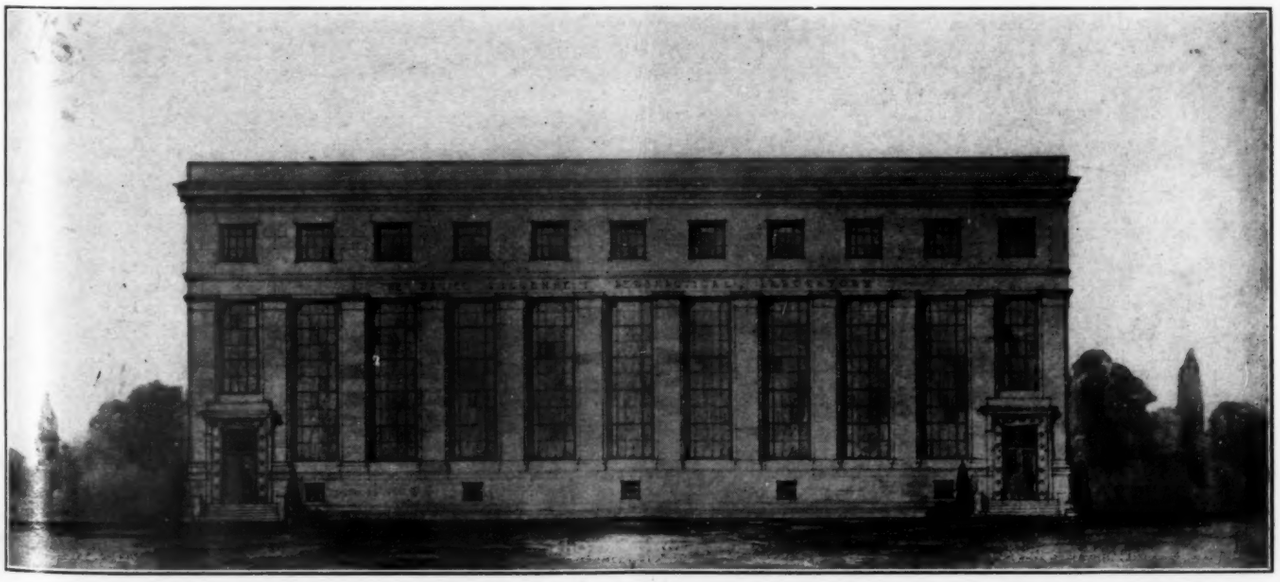
"As a pioneer in aeronautical engineering, the Massachusetts Institute of Technology has in the past undertaken investigations of far-reaching importance. The prospects of a new building with additional facilities and laboratories will permit the Institute to carry out new work of great importance in the future. The appropriation to provide a new building at the Institute is another indication of the desire of the Daniel Guggenheim Fund to encourage constant advancement in aviation in America."

The head of the Department of Aeronautical Engineering at the Massachusetts Institute of Technology is Prof. Edward P. Warner, who is now on leave of absence to serve as Assistant Secretary of the Navy for Aeronautics.

R.A.F. Pilots Urged to Chew Gum

Royal Air Force pilots have been advised to acquire the habit of chewing gum while flying, as an "aid to descents." The theory that the creating of saliva, the result of chewing, assists in overcoming the difficulties experienced by many fliers in swallowing when coming down rapidly, has caused this recommendation!

The Royal Air Force in its training manual gives numerous instances where chewing gum has been successfully used. During a descent from a high altitude, it is claimed, it is important that the air pressure in the ears should be equalized, and swallowing aids this by opening the Eustachian tubes!



The architectural layout of the new Guggenheim aeronautics building at Massachusetts Institute of Technology, Cambridge, Mass.

A World Flight in 24 Days

Publisher of Aviation Plans to Make Trip During 1927

ACCEPTING AN invitation from the Soviet Russian officials and the German Luft Hansa air combine, Major Lester D. Gardner, Publisher of AVIATION, announced on Jan. 14, 1927, that he would attempt to make an air trip around the World in twenty-four days this Spring, —four days less than the present record.

Major Gardner told of his plans during a lecture at the Technology Club of New York on his 21,000 mile flight around the commercial air routes of Europe, Asia and Africa last Summer. He plans to travel West from New York using only the regularly established commercial air lines and not employ any special planes, automobiles, trains or boats.

To Use Peking-Moscow Route

The proposed schedule of Major Gardner will be made possible by opening of the Peking-Moscow air line which will be jointly operated by the Luft Hansa and the Soviet Russian Government. The new Japanese airlines will connect the steamer at Yokohama with Pekin via Korea. The transcontinental passenger service over the present U.S. air mail route, it is hoped, will have been opened through the encouragement of the Post Office Department and the Department of Commerce. With these new air transport facilities, Major Gardner expects that very soon a trip around the World can be made during a three week's vacation and at a very nominal cost, compared to present travel facilities.

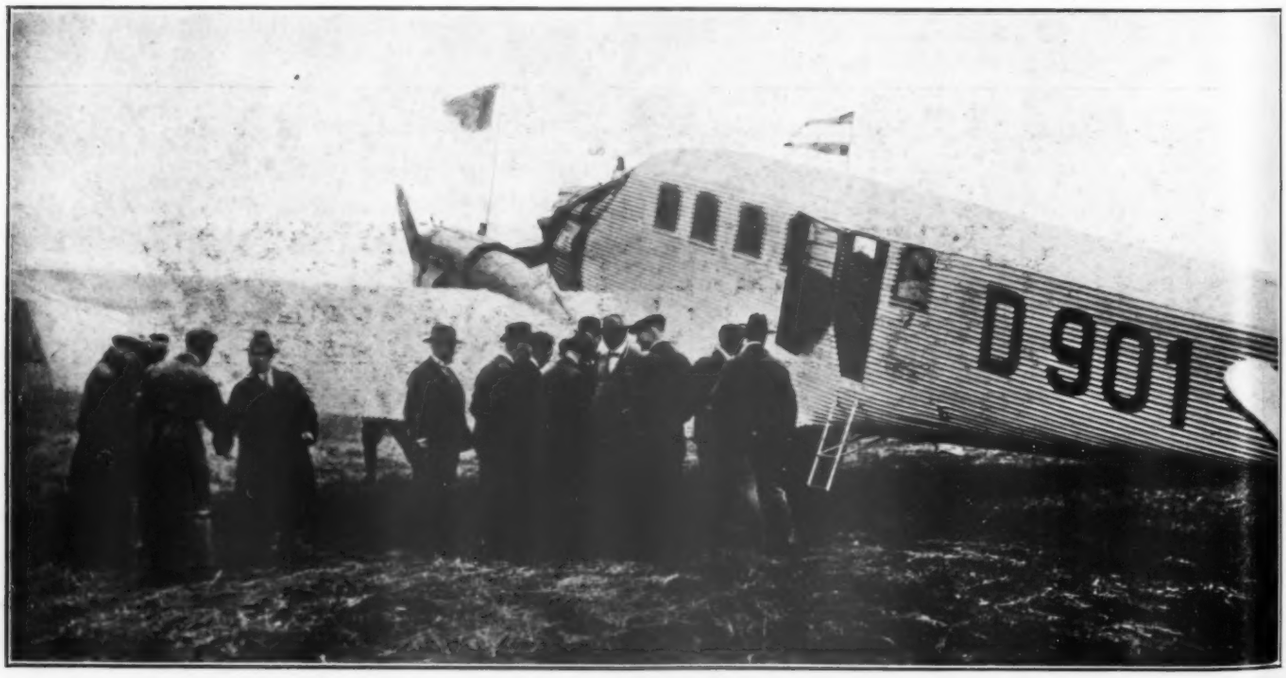
"Last year," said Major Gardner, in speaking of the trip during his lecture, "we flew all over the commercial air lines of Europe enjoying more comfort than would have been possible by the most luxurious European compartment cars. We flew 21,000 miles, which is farther than the proposed trip around the World, without any difficulty whatever, and I believe that, commencing this year, the air lines and steamships will arrange their schedules so that anyone wishing to make this interesting trip will be able to step from steamer to plane and from plane to steamer and encircle the World in twenty-two days.

"Last year when I flew from Constantinople to Moscow, via Berlin, Theodore Rothstein, member of the Soviet Executum, who looks after foreign relations at the Russian capital, invited me to return this year and fly, not only over the new Moscow-Peking air line, but over the many other passenger lines now operating in Russia. At a dinner in Berlin, after I had flown from Moscow in one day, Otto Merkel, Director of the Deutsche Luft Hansa and Dr. Robert Knauss, who recently flew three planes from Moscow to Peking on the path-

Lieut. Leigh Wade (Left) of the Around the World fliers discussing plans of the "Round the World in Twenty-four days" trip with Major Gardner.

finding trip, invited me to make the first flight when the line opened. He has sent me a message this week that the line will start in the Spring, and he hopes that Mrs. Gardner and I can make the first trip.

"The new services will demonstrate as no air enterprise heretofore attempted, the practicability and advantage of air travel. With all the links of the around-the-World route in operation, it will be only a short time when Atlantic and



The start of the round trip flight from Moscow to Peking. Dr. Knauss leaving Moscow in a three engined Junkers last September

Pacific air lines will be demanded, and I believe that a regular passenger service around the entire globe will be available in the very near future."

Major Gardner has no definite plans as to the date on which the trip will start, owing to the necessity of synchronizing the steamship sailing dates with the air schedules. After making the decision to take the trip, he cabled the Deutsche Luft Hansa as follows: "Reserve place first Peking-Moscow trip stop attempting round World trip twenty-four days." The following reply was received: "Date first Peking-Moscow trip not yet decided stop will advise you in time and reserve accordingly."

The trip will be made, not only to show the possibility of speed but as a demonstration of the low cost, comfort and safety of the new air routes.

In 1926, Messrs. Evans and Wells circled the globe in 28 days, 14 hr., 36.5 min. and the trip cost $32,000. These two travellers kept moving day and night, with very little rest. Major Gardner believes that it will be entirely possible to reduce the time by four days and yet only fly two nights.

The National Aeronautic Association has been requested to petition the Federation Aeronautique Internationale to make the around-the-World trip by air and steamship a recognized record trip.

By this, encouragement would be given to the spanning of the oceans and making the entire trip by air increasingly frequent until it will become a regular air route of the greatest importance.

The Pan-American Flight

As it is difficult for readers to follow week by week the progress of the planes engaged in the Pan-American Flight, it has been decided to give the various stages of the flight, from the start, on Dec. 21.

The history of the flight to date is as follows:

Dec. 21, 1926	Five planes left San Antonio, Tex., at 11:30 a.m. They landed at Point Isabel, Tex., at 1:55 p.m., a 260 mile hop, being made in 2 hr., 40 min., and remained at Brownsville, twenty miles distant, over-night.
Dec. 22	Arrived at Tampico, Mex., 6 p.m., after a 260 mile flight.
Dec. 23	Major Dargue, arriving at Tampico, reported the St. Louis had burned out its engine. The other planes awaited repairs to damaged machine. The fliers visited Mexico City, via rail, and presented President Coolidge's letter to President Calles.
Dec. 27	It was reported that the San Francisco had proceeded to Vera Cruz.
Dec. 30	It was reported that the New York, St. Louis, San Antonio and Detroit had arrived at Vera Cruz from Tampico, in the afternoon, making a flight of 136 miles in 2 hr., 40 min. flying time.
Dec. 31	Fliers landed at Minatitlan at 12 p.m.
Jan. 1, 1927	The fliers remained at Minatitlan one night, leaving at 11:25 a.m. for Salina Cruz. They reached Salina Cruz at 12:48 p.m., making a flight of 150 miles across the Isthmus of Tehauntepec in 1 hr., 15 min., with a fifty mile gale blowing. The planes left Salina Cruz for Guatemala at 7:10 a.m., reaching Guatemala at 1:05 Central Standard Time. The fliers were presented to President Chacon.
Jan. 5	Shortly after taking off at Guatemala City, the engine of the New York failed, and the flight was delayed a few days. The personnel was O.K.
Jan. 11	The five planes took off at daybreak from Guatemala City, for San Salvador. The New York was ordered to go to Panama as rapidly as possible. The fliers arrived at San Salvador at noon.
Jan. 13	The fliers arrived at Amapala, Honduras, at 9:10 a.m., covering more than 200 miles in less than 2 hr.
Jan. 14	The New York and St. Louis arrived at France Field, Panama, from Puntarnas, Costa Rica.
Jan. 15	The San Antonio, San Francisco and Detroit arrived at Managua, Nicaragua, from Amapala. The fliers were welcomed by Minister Eberhardt and Nicaraguan officials. The three planes left Ampala and arrived at Punat Arenas, Costa Rica, 3:30 p.m.

Shortly after their arrival at Punatar Arenas, Costa Rica, the personnel of the airplanes Detroit, San Antonio and San Francisco went to San Jose, Costa Rica, and delivered a personal message to President Jiminex from President Coolidge. On Jan. 18 the fliers left Punatar Arenas at 7:30 a.m. and arrived at David, Panama. After a short stop at this point, they flew to France Field, arriving there at 5:30 p.m. As they approached the Canal Zone, a squadron of planes in battle formation met them and escorted them to the landing field. All five planes are now at France Field.

Short Wins Harmon Trophy for America

Shirley J. Short, a pilot in the Air Mail Service, has been awarded the Harmon Trophy for 1926, by a decision of the American Section of the International League of Aviators, announced Jan. 13. The decision was based on the fact that Short flew 2,169 hr., 14 min., between July 1, 1923 and Nov. 30, 1926, without serious mishap, on schedule air mail flights, night and day, in all weather and with various types of planes.

The winner of the Trophy was born at Elliott, Ill., Jan. 8, 1895, and was appointed to his present position in the air mail service March 2, 1923. He received his training at Barron Field, Fort Worth, Tex., and had flown between 1,000 and 2,500 hr. before joining the air mail service.

The Harmon Trophy of U.S.A.

His mileage with the Air Mail totaled 175,520 miles in about two and a half years. Since his appointment to the Service he has flown 2,382 hr., 7 min., and has covered a distance of 235,754 miles up to Dec. 31, 1926. During 1926, he was in the air a total of 718 hr., forty-seven per cent of this flying being at night. He is employed on the transcontinental route and operates between Cleveland and Chicago.

The Harmon trophies, donated by Clifford B. Harmon, president of the International League of Aviators, are of two classes. The first trophy is awarded to that member of a League Post who, in the judgment of the jury, performs the most meritorious feat for the advancement of aviation during the year for which the trophy is awarded. In addition, Mr. Harmon has donated to the Vieilles Tiges of France a trophy to be known as the Lafayette Escadrille Memorial Trophy.

The Harmon Trophy for Japan was awarded to Comdr. Hirosi Abe, who last year flew from Tokio to Paris and London. The trophy for France went to Pelletier d'Oisy for his Mediterranean flight and the trophy for Italy to Major Mario de Bernardi, for his victory in the Schneider Trophy race.

At the moment of going to press it is announced that the Lafayette Trophy has been awarded to Capt. Pelletier d'Oisy for his Paris-Peking Flight.

Air Mail Pilot Shirley J. Short, winner of the Harmon Trophy.

The Cost of Operating 3-Engine Planes

Letters from C. G. Peterson, Wright Aeronautical Corp., and R.B.C. Noorduyn, Atlantic Aircraft Corp., Discuss Operating Costs.

A STATEMENT published in the Publisher's News Letter for Dec. 27, 1926, has aroused considerable comment. The News Letter discussed the costs of running air transportation, basing certain deductions upon the experience of the P.R.T. Air Service in operating the Philadelphia-Washington-Norfolk route. The following statement is extracted from the Publisher's News Letter under discussion—EDITOR.

"The Philadelphia Rapid Transit Air Service, which operated a route from Philadelphia to Washington and later extended it to Norfolk, suspended operations for the Winter on Nov. 30. The total operating cost, which does not take into consideration capital investment, was $169,000. As 93,770 miles were flown, the operating cost for a Fokker three-engine plane was found to be $1.80 per mile. The total revenue was $46,200 from passengers and $4,400 from mail and express or $.53 a mile. The conclusion of the P.R.T. is that 'Transportation of passengers and merchandise can be made to provide about 50 per cent of the total operating cost'. The obvious conclusion is that the air mail must provide for the other half. Roughly, if 60 lb. of mail had been carried on every trip at the rate of $3.00 per lb. the total operating costs would have been met."

What is Operating Cost

In commenting upon these statements Mr. Peterson sends an extremely interesting communication. He says:

"There are some points in the Publisher's News Letter of AVIATION for Dec. 27, 1926, that appear to me to be misleading in the manner in which they are presented. Take the matter of your statement on the operating cost of Philadelphia Rapid Transit Company Air Service in which you take the total operating cost and divide by the total number of miles flown and state that the operating cost for a Fokker three-engine plane is the quotient of these two figures. The figure that you obtained was the operating cost per mile of the P.R.T. Air Service and undoubtedly included a number of items which ran into fairly large sums such as sales expenses, motor bus transportation, hangar and waiting room expense, executive overhead and other items which are general expense to an air service but which cannot be considered as part of the operating expense of a given plane.

"As a matter of fact, from the figures that we have received, the operating expense of the Fokker airliner powered with three Wright Whirlwind engines, as used by P.R.T. Air Service, was very moderate. The operating expense of a plane should include the fuel and oil, maintenance of power plant and airplane, wages of pilot and mechanics for the plane and some cognizance should be taken of depreciation, although whether depreciation should be considered part of operating cost is open to question. I will tabulate below some of these charges, as we see them, for a Fokker airliner powered with three Wright Whirlwind engines. As the unit costs on fuel and wages will vary in various sections, I will leave it to you to fill in these unit costs but if you will take the unit costs in this vicinity you will find that the cost per mile of operation of this type of plane is only a small fraction of the cost per mile as stated in the Publisher's News Letter.

(a) Fuel consumption for Wright Whirlwind engines in P.R.T. service averaged 10.5 gal. per hr. for 6-months' operation, or 31.5 gal. per hr. per plane. The average speed was approximately 90 m.p.h. for 3.5 miles per gal.

(b) The oil consumption for 6 months averaged .2 gal. per hr. or .067 gal. per mile per plane.

(c) For a total of 3552 engine hours they used $75.53 of replacement engine parts, an average of $.021 per engine hour or $.006 per plane mile, cost of engine replacement parts.

(d) Nine of the engines were overhauled during the Summer and the overhaul labor per engine was about 40 man hours. The overhaul was done at approximately 250 hr. The labor for overhaul per flying hour was therefore 40 man hours divided by 250 or .08 man hours per engine or .0026 man hours per plane mile.

(e) I do not have the exact figures on the cost of plane maintenance but it ran almost as low as the engine maintenance.

(f) If you will add an average figure for pilot's wages per mile and the mechanic for the plane and a couple of laborers to clean it and re-fuel, you will arrive at the true cost of operation of a three-engine Fokker airliner with Wright Whirlwind engines.

(g) In the matter of depreciation, we consider it reasonable for an operating company to figure depreciation on their Whirlwind engines for a total life of 1500 hr. of normal operation. It is possible that this figure is too low and that 2000 hr. total life might be justified, but a great deal depends upon the nature of the service. It is my understanding that the Fokker Company considers a minimum of 3500 hr. in figuring depreciation on their airliners and for certain classes of service they consider a much longer life than 3500 hr.

"The point that seems to have been misconstrued in the News Letter is that the cost of operating an air service is several times the cost of operating the planes themselves. This is probably due to the heavy overhead charges being accumulated against the operation of one or two planes per day over a given route. One can imagine how expensive it would be to maintain a railroad for only one round trip made per day between two terminals whereas when the traffic grows to a point where a number of planes per day can be operated between the terminals the cost per mile of the air service will be decreased to a point closer to the operating cost per mile of the planes themselves.

"The foresight of Congress in including in the Kelly Air Mail Bill the authorization to the Postmaster General to carry 2c letter mail by airplane is apparent in this connection. One can forsee that it will not be many years hence when the American public will demand that the regular letter mail between the larger cities which are separated by sufficient mileage, shall be carried by airplanes without the excess postage now being paid. For instance, the volume of letter mail originating in New York for Chicago is not so great but what it could be carried in two or three modern airplanes. Since this provision was made by Congress in the Kelly Air Mail Bill, I believe that we should all look forward to the time when the Post Office Department will act on this authorization and the arguments presented by P.R.T. for consideration of this matter will be more forward looking perhaps than the view point of some who have been connected with the aeronautical industry for a much longer period than the organizers of this operating line. It is possible that the view point of the Mitten Management, trained as they are in the management of many kinds of transportation, is clearer than the view point of men who have been considering aircraft from military or manufacturing standpoints.

"In regard to three-engine planes versus single-engine planes, there are, of course, distinct fields for both types just as there are distinct fields for open cockpit planes as well as for cabin planes. Nevertheless, where an operating company desires to educate the public to the use of airplanes for passenger, express or mail work, featuring their safety and dependability, the psychological ad-

vantages of the three-engine plane are tremendous. It is my personal belief that on most lines which are to be supported by the public, this public support will be much more readily obtained with three-engine planes than with single-engined planes. But please do not infer from this that I minimize the importance of single-engine planes."

A Similar View

Taking a similar attitude and adding further valuable comments, R. B. C. Noorduyn, of the Atlantic Aircraft Corp., writes as follows:

In the Publisher's News Letter of your issue of Dec. 27, 1926, you comment on the operating cost of the Philadelphia Rapid Transit Air Service, which ran a passenger and mail line between Philadelphia, Washington-Norfolk from July to December, 1926.

The P.R.T. issued in their Service Talk a statement as to their total expenditure of this enterprise. In your comment, you divide this figure by the number of miles flown and then state: "the operating cost for a Fokker three-engine plane was found to be $1.80 per mile".

Now, from the various reactions we have received from different sources, it seems that this statement has created a false impression, owing to the term "operating cost" in your statement being confused with the "flying cost". We do not believe that, in any other statement which has been published as to the operating cost of airplanes, any such expenditures as the P.R.T. incurred have been included in the operating cost.

At the time the P.R.T. service was started, Mr. Mitten described it in his letter to Mayor Kendrick as the "P.R.T. contribution to the Sesqui-centennial, an exhibit containing the latest in aerial transportation". He also stated: "The Fokker airplane, a pioneer in air transportation, I found to be the most dependable in the opinion of most users....Ascertaining that Mr. Fokker could and would build the necessary number of planes and would undertake the responsibility of supplying a safe and satisfactory service, I agreed to support a daily airplane passenger service between Philadelphia and Washington during the Sesqui". In three weeks from the time of that decision the line was established and in operation. The special effort in itself could, naturally, only be carried out at unusual cost.

Conceived as a demonstration, the P.R.T. set up and operated their air service with the principal object of deriving as much advertising value for the Sesqui-centennial and for themselves as possible, and the selection of their route was purely based on making as great a public impression as possible of the safety, regularity, reliability and comfort of air travel, particularly in Government and other influential quarters where such a demonstration would have the most extensive beneficial effect on the support of air transportation. Anyone who saw the P.R.T. service in operation knows that, colloquially speaking, "the thing was done in style". The special equipment and operation of large buses to and from the fields, the uniforms of all operating personnel and attendants, the specially designed and built passenger stations and hangars, the leasing and grading of an entire private field within 10 min. of the center of Washington, the advertising, publicity, posters, circulars, sky-signs, passenger insurance, and other traffic selling and handling means, no doubt achieved the effect of a demonstration to the maximum extent, but the total cost went up correspondingly and cannot be used for purposes of comparison with other lines. Expenses of this kind vary with the special conditions and ideas of each operator; they bear no relation to the flying cost of the airplanes and are in no way within the control of the designer and manufacturer of the airplanes.

Under the term "flying cost", which is governed by the design and manufacture of the airplanes, the following items are included:

Gasoline
Oil and grease
Airplane line service, maintenance, repairs, repair replacement parts, exchanging of engines, cleaning, handling, etc.
Engine line service, maintenance, repairs, repair and replacement parts, overhauls, cleaning, etc.
Depreciation of airplanes and engines.
Pilots: salary, flying pay and bonus.

The figures obtained direct from the operating of the Fokker Trimotors show that these items, which make up the actual flying cost of the airplanes, have totaled a fraction over 64c per mile. In this figure the only estimated items are the writing off of airplane and engine, which has been taken at 3000 and 1500 hr., respectively.

There are a number of Fokker planes in operation which have done over 3500 flying hours. We believe that this flying cost for three-engined airplanes, capable of carrying a payload of 2300 lb. in addition to a crew of two and fuel for five hours, will be interesting information for many people, especially as these costs can and will be reduced considerably under more economical operation conditions such as are brought about by the use of a larger quantity of planes over longer distances, without a commensurate increase in overhead, by the lower cost of the airplanes as the quantity produced increases, etc.

Wright Aeronautical Corp. Awarded Plaque

A special committee of the Aeronautic Executives Association presented a large bronze plaque, commemorative of Commander Byrd's flight to the North Pole, on the Fokker Trimotor with three Wright Whirlwind engines, to the Wright Aeronautical Corporation, on Jan. 12. The presentation was made to Charles L. Lawrance, the plaque typifying the most outstanding event in aeronautics during 1926.

The bronze plaque awarded the Wright Co.

The award was based on the report submitted to the Hon. William P. MacCracken, Jr., Assistant Secretary of Commerce for Aviation, that the Wright Whirlwind engines in American commercial planes had flown during 1926 a total of 1,774,248.8 miles, or a distance of seventy-one times around the World, with only three forced landings due to engine failure. The safety record of 600,000 miles, or a distance of twenty-four times around the Equator per forced landing, establishes a record safety factor in commercial aircraft engines.

The plaque is framed in black velvet with a bronze plate below. A heavy bronze and mahogany frame hold the plate.

Venice-Rome Air Service

Commercial air service between Venice and Rome is to be instituted during the first part of 1927 and plans have been made by the Societa Transadriatica, with the object of starting the Venice-Rome service. as part of the existing Venice-Vienna air service now operated by that company. This would make the route Rome-Venice-Klagenfurt-Vienna and return. A trial trip has already been made from Venice to Rome, preparatory to the opening of the regular service, with a tri-motor Junkers monoplane. On this trial the distance was completed in 3 hr., 11 min., with seven passengers, which would make the trip from Rome to Vienna via Venice and Klagenfurt about six hours or slightly more, as the best time made so far between Venice and Vienna is 2 hr., 28 min., while it usually takes about three hours to complete the Venice-Vienna route via Klagenfurt.

The Air Corps Unit at N. Y. University

University R.O.T.C. of Great Potential Value to the Air Corps

IN THE past reports of Major Gen. Mason M. Patrick, Chief of the U. S. Army Air Corps, there has been a continual reference to the need of an increased number of Air Corps Units in the Reserve Officers Training Corps attached to the universities throughout the country. The R.O.T.C., at New York University, incorporates an Air Corps Unit, which is one of the most active in the country, and from the experience of the past few months at New York University, it can definitely be stated that the average student has very much more than a casual interest in the progress of aviation.

The Unit is under the charge of Lieut. Frederick M. Hopkins, Jr., Air Corps, and he reports the attendance record at the university classes to be very nearly perfect, the questions asked at classes indicating a high standard of knowledge on aeronautics in general, and evidencing considerable outside reading on the subject.

Regular Army officers explain the operation of the bombing sights on a Martin Bomber to R.O.T.C. officers at Summer camp.

Undoubtedly, the romance of flying and its novelty among the students give the Air Corps Unit a high morale. With two squadrons competing against six infantry companies during the Fall outdoor period recently completed, the Unit secured five out of eight official ribbons awarded at the weekly inspection and review, signifying general excellence in infantry drill. During this period, the Unit was reviewed by the Hon. F. Trubee Davison, Assistant Secretary of War for Aviation, Gen. Hugh A. Drum, General Crinshank and Daniel Guggenheim, the founder of the Guggenheim School of Aeronautics at the New York University.

Leading Colleges Have Units

The establishment of the Air Corps Unit by the War Department, effective Sept. 1, 1926, has met with the popular approval of the student body and of the faculty of the university. Similar Units have been in existence for a number of years at the University of Washington, University of Illinois, Georgia School of Technology, Texas A. & M. College, University of California, and Massachusetts Institute of Technology. With the Unit of the latter institution, the New York Unit shares the distinction of being organized at a university having a regular established school of areonautics.

The instruction prescribed for the Air Corps contemplates a progressive course of study and practical exercises covering the four years' work at college. In order to facilitate the work and to provide the necessary military training, the basic course of the freshman and the sophomore years is co-ordinated with that of the Infantry Unit. The policy is to develop reserve airplane pilots, and the instruction includes the four years of college work, the advanced camp course scheduled between the Junior and Senior years and the prescribed primary flying course at the Air Corps Flying School at Brooks Field, Tex. following graduation. Students completing the entire course qualify as Second Lieutenants, Air Corps Reserve and Junior Airplane Pilots of the Air Corps. To those students who are unable to take the primary flying course which is considered extremely necessary, the instruction is intended to give within the time permitted, training in the duties of the airplane observer and the airplane bomber. The Air Corps urgently needs airplane pilots and every encouragement is given students to elect the flying training in Texas.

The instruction as outlined for each year's work consists of the following courses:

First Year Basic

Time required by Law (3 hr. per week) ..... 96 hr.

Subject	*Time Allotted*
Markmanship	10 hr.
Military Courtesy	3 hr.
Military Hygiene and First Aid	8 hr.
History of Aeronautics	6 hr.
Communications Practice	5 hr.
Command and Leadership	64 hr.

Second Year Basic

Time required by Law (3 hr. per week) ..... 96 hr.

Subject	*Time Allotted*
Aircraft Engines	10 hr.
Communications Practice	15 hr.
Air Corps Fundamentals	5 hr.
Air Corps Small Arms	15 hr.
Command and Leadership	39 hr.
Interior Guard Duty	4 hr.
Scouting and Patrolling	8 hr.

First Year Advanced Course

Time required by Law (5 hr. per week) ..... 180 hr.

Subject	*Time Allotted*
Observation Aviation	46 hr.
Airplane Instruments	5 hr.
Aerial Photography	10 hr.
Aerial Gunnery	10 hr.
Aerial Navigation	5 hr.
Bomb Racks and Sights	5 hr.
Tactics of the Division	10 hr.
Communications Practice	15 hr.
Military Sketching & Leadership	24 hr.
Command and Leadership	30 hr.

Second Year Advanced Course

Time required by Law (5 hr. per week) ..... 180 hr.

Subject	*Time Allotted*
Bombardment Aviation	25 hr.
Observation Aviation	20 hr.
Pursuit Aviation	3 hr.
Attack Aviation	2 hr.
Meteorology	6 hr.
Communications Practice	15 hr.
Administration	8 hr.
Military History, and National Defense Act	20 hr.
Military Law	12 hr.
Rules of Land Warfare	4 hr.
Tactics of the Corps and Army Troops	15 hr.
Command and Leadership	30 hr.

The Advanced Camp is given at the end of the Junior Year. The Air Corps R.O.T.C. Unit of New York University will undoubtedly be trained in conjunction with the Unit from Massachusetts Institute of Technology at Langley Field, Hampton, Va., the home of the Air Corps Tactical School and of the 2nd Bombardment Group of the Air Corps. The field is located within a few miles of Old Point Comfort, Fortress Monroe, Newport News, Norfolk and Hampton Roads, and facilities for training are excellent. Regular Army Pilots with many hours of experience are assigned to the camp and for a period of six weeks the students conduct observation and bombardment flying missions. Airplanes of the Martin Bomber, Douglas O-2, Curtiss JN and Army DH-4B types have been heretofore used in the training. Each plane is equipped with radio telephone or telegraph, cameras etc., necessary for the mission ordered and the students are trained for air proficiency rather than ground proficiency.

During last Summer, the entire R.O.T.C. of the Massachusetts Institute of Technology Air Corps Unit successfully completed a cross-country flight of 400 miles from Hampton, Va. to New York City, N. Y. and return as a navigational problem.

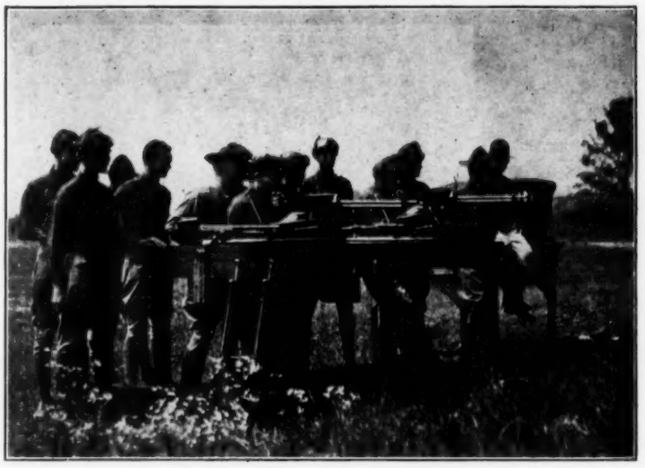
The students receive during the advanced course, commutation of rations at a rate prescribed by the Secretary of War, a complete officer's uniform which becomes the personal property of the student upon successful completion of the course, pay at camp at a rate prescribed by law for the 7th grade enlisted men of the Army, transportation to and from camp, sustenanse and medical supplies and attendance, etc., while at camp.

Preparatory to Regular Service

Upon graduation, students completing the four years R.O.T.C. course are commissioned as Second Lieutenants, Air Corps Reserve. Under the present plan, those electing may be ordered to the Air Corps Primary School and are given pilots instructions for four months. Upon graduation the Junior airplane pilots rating is conferred and the duty has been heretofore performed on the Status of a Second Lieutenant of the Reserve Corps differing in no particular from the status of the regularly commissioned officer. With the growing need of Air Corps officers, graduates of the primary school have an excellent chance of being commissioned in the Regular Air Corps.

The enrollment in the New York University Air Corps Unit has been limited to 130 students for this semester. The facilities for the instruction, the availability of but one Regular Army Air Corps instructor, the rigid medical examination required by the War Department for flying, the lack of appropriations which limit the number of Advanced Course students may be suggested as causes of this limitation. It can be fairly said that the unit is popular, and the prospects of flying during the Summer camp and after graduation are being looked forward to with anticipation.

Much of the credit for the successful establishment of the Unit is due to the faculty of the Daniel Guggenheim School through whose efforts the unit was approved by the War Department. A large lecture hall has been assigned to the unit in the new aeronautical building which has just been completed. The room has been equipped to serve as a communications room as well as a lecture room—a real headquarters for the Unit. The equipment supplied by the Ordinance Department such as machine guns, bombs, synchronizing systems, etc., the radio equipment of the Signal Corps and the equipment of the Army Air Corps such as aircraft instruments, aircraft engines and propellers, aerial cameras, etc., is being arranged as a permanent exhibit and



Machine gun practice at Summer Camp

will be of unquestionable value to the Air Corps, R.O.T.C. students in their military training and to aeronautical students of the university in their design courses. Enlargements of photographs have been secured and will tell the story of aeronautical progress from the drawings of De Vinci to the present day military airplanes.

The faculty of the Daniel Guggenheim School of Aeronautics encourages its students to enroll in the Air Corps Unit. The training being of a tactical and a practical semi-technical nature affords the aeronautical student a training from an entirely different point of view from the more highly technical courses in his curriculum. The possibilities of flying training deemed desirable if not essential, is being given serious consideration by the students.

One of the largest student organizations on the university campus is the Aeronautical Section of the A.S.M.E. chapter. Through the efforts of the School of Aeronautics, supplemented by efforts of the Military Department, R.O.T.C., prominent designers, pilots, engineers in and about New York City complete a program covering many interesting phases of contemporary progress in aviation.

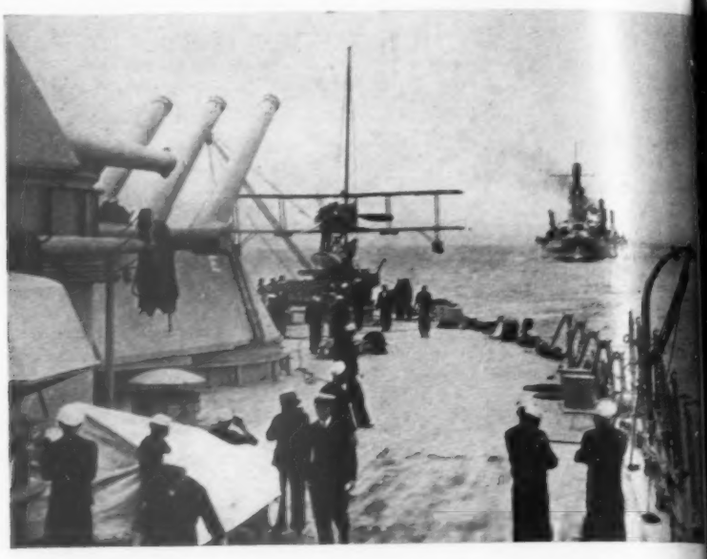
The Regular Officers assigned to duty with the Military Department, R.O.T.C. at New York University are Col. Russell C. Langdon, Inf., P.M.S. & T, and Major Charles Kivlen (retired), Capt. Wallace Hackett, Inf., Augustus B. Connell, Inf., and Lieut. Frederick M. Hopkins, Jr., Army Air Corps, the latter being directly responsible under Col. Langdon for the organization of the Unit.

OVER HISTORIC CIVIL WAR TERRAIN.—The R.O.T.C. officer views the situation of the Union Army on the James Penninsula. A bombing practice flight in a Martin Bomber.

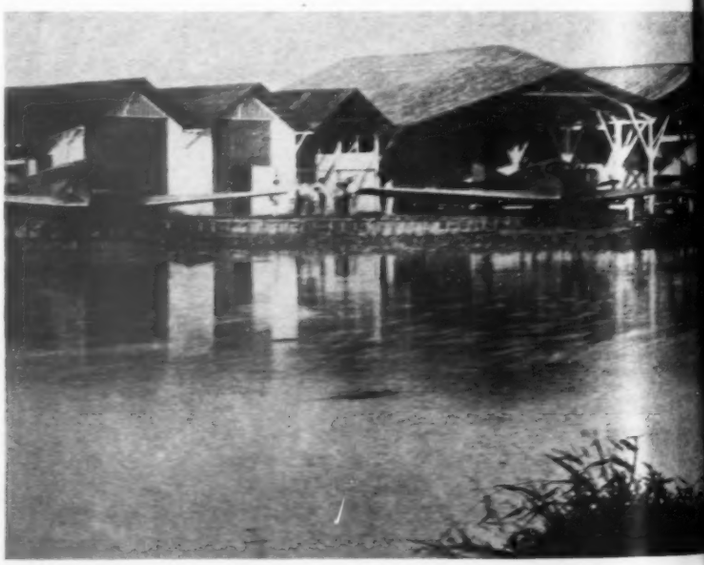
PICTURES

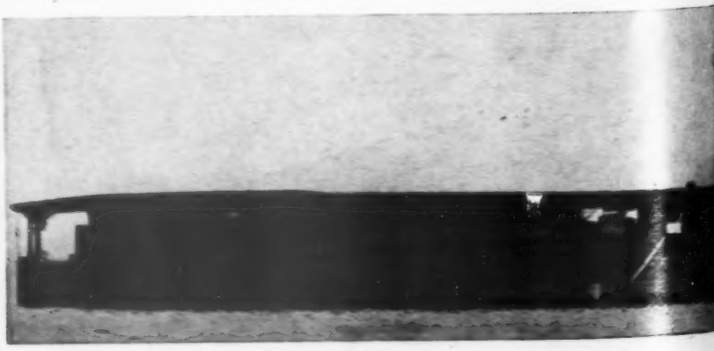
CHARACTERISTIC LINES. The latest Dornier product, an all-metal air liner carrying eight passengers and two pilots. The machine is known as the Merkur and is equipped with a 450 hp. BMW VI engine.

SIR ALAN ON THE CANVAS. Frank O. Salisbury, the well-known English artist, has recently completed, at his studio in New York, the portrait of Sir Alan Cobham, the famous British flier who is lecturing in this country. The portrait is on view at the Duveen Galleries, New York.



P & A Photos.
AIR AND ANTI-AIR. A Vought UO-1 (Wright Whirlwind) on the catapult of the U.S.S. California of the 5th. Division of the U. S. Fleet off San Diego. Note the triple anti-aircraft guns.



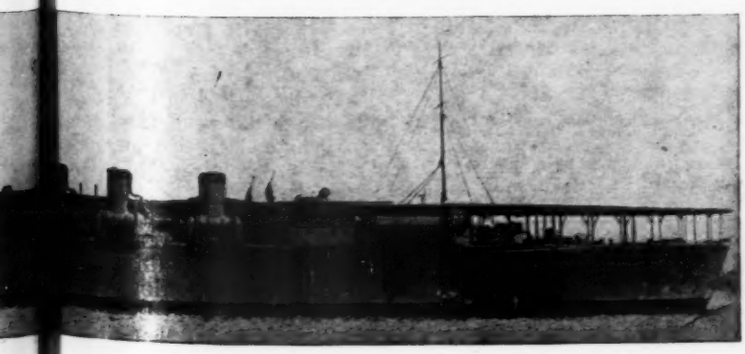


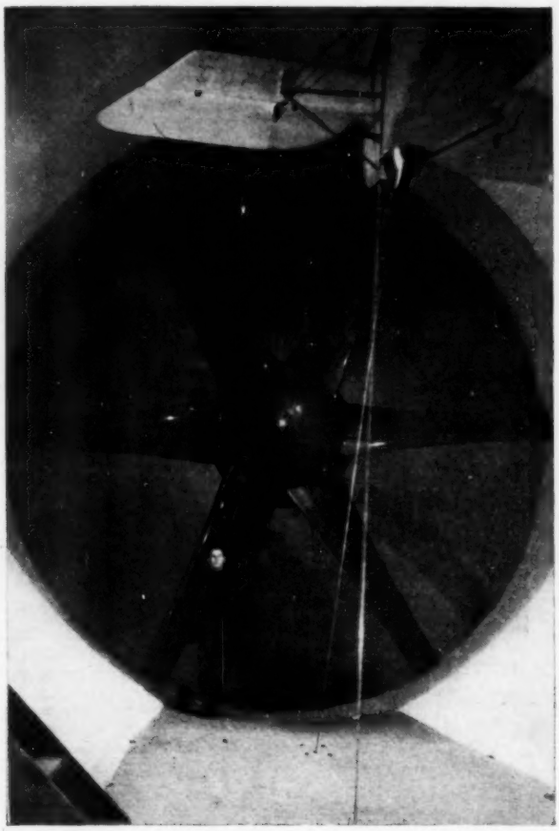
THE NEWS

P & A Photos.
COURIERS OF THE AIR. Wesley L. Smith of the New York-Chicago Night Air Mail Service, handing to E. C. Garrabrant of the New York Postal Department new year greetings from Postmaster J. E. Power of San Francisco and bringing to a close a year of trans-continental air mail service marked by consistency and speed never before equalled. The legend, chisled in stone on the General Post Office in New York—"Neither snow, nor rain, nor heat, nor gloom of night stay these couriers from the swift completion of their appointed rounds"—was never more forcefully exemplified than in the Air Mail.

(Left)
A PEEP AT THE SCADTA SYSTEM. Some of the "flying stock" of the Scadta company operating the air service up the Magdalena River, Colombia, S. America, at the Barranquilla depot.

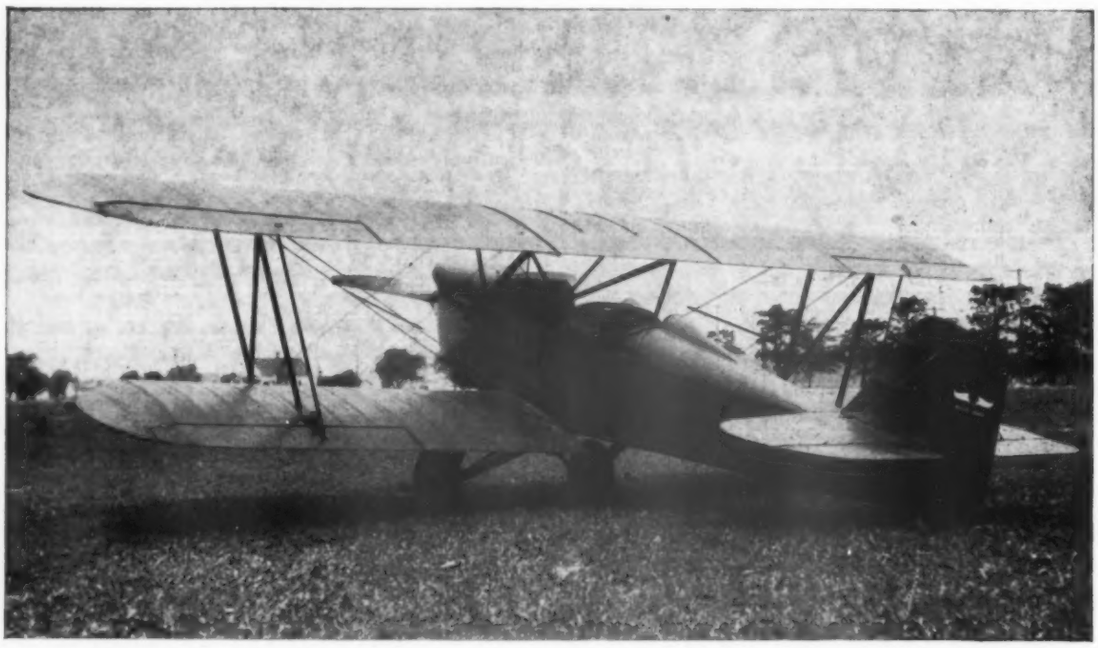
JAPANESE AIR POWER. The new Japanese aircraft carrier, Hosho, the funnels of which lower horizontally outwards when planes land or take off.





P & A Photos
AERONAUTICAL RESEARCH. The fan of the 18 ft. diameter wind tunnel at the Moscow Aerodynamic Institute, Russia, in which full-scale airplanes are said to be under test.

AIR REGISTRATION. Assistant Secretary of Commerce MacCracken (left) and Clarence M. Young, chief of air regulations division, Dept. of Commerce, inspecting the first airplane to be registered under the new regulations for civil aviation. The N-1 is a DH acquired by the Aeronautics Branch for administrative purposes.



A three-quarter rear view of the Hess Blue Bird three-seater (OX5)

The Hess Blue Bird

A Small Three-Place Sport Commercial Plane

THE HESS Aircraft Company, of Wyandotte, Mich., has for some time been experimenting in the development of a small three-place commercial airplane, to be built around the OX-5 engine, and as a result of this preliminary work, the Hess Blue Bird has recently been produced and placed on the market. The first machine of this type actually appeared at the Ford Airport, Detroit, at the time of the start of the Airplane Reliability Tour last Summer. Since then, however, the machine has undergone further development and improvement, until it appears in its present form, in which every endeavor has been made to meet the demands of the private owner and the service operator.

The machine is a normal single-bay biplane, with two tandem cockpits, the forward one seating two passengers side-by-side. The designers of the Hess Blue Bird have produced a machine, which, in general appearence, resembles very closely that of a high-speed military airplane. The machine is small and yet in no way can it be said that the pilot and passengers are cramped.

Welded Steel Fuselage

The fuselage of the Blue Bird is a welded steel tube framework, fabric covered. It is constructed in steel jigs, which serve the purpose of correctly locating the positions of wing and undercarriage fittings and other structural details. In the construction of the fuselage frame, all major joints are heavily reinforced with steel gusset plates, welded in, and all critical members are of chrome-molybdenum steel. The engine bearers are constructed of square seamless steel tubing.

The undercarriage is of the split axle type, similar to that en ployed in military airplanes. Chrome-molybdenum steel tubes are used in the undercarriage, these being streamlined with balsa wood.

The wings are of normal wood construction, braced internally with No. 9 hard wire. The main spars are formed of routed spruce with ribs of three-ply mahogany Haskelite webs with spruce cap strips. The compression members in the wings are formed of heavy plywood box ribs, complying with Army and Navy standards. The rib spacing in the wing structure is very close, ranging from eight inches in the slipstream to twelve inches in the outer sections. All the bolts used in the wing structure are of special heat-treated alloy steel.

Wing Structure

The wing bracing consists of single N-struts with a normal wire system, in which 3/16 in., nineteen strand, non-flexible Roebling cables are employed and are double. In the lateral control system, four ailerons are incorporated. Unlike the wing structure, these ailerons are formed of metal frames, fabric covered, and all control wires pass inside of the lower wing panels. Upper and lower ailerons on each side are interconnected by means of a vertical strut.

In the tail unit, with the exception of the framework on the fins and stabilizer, which are formed of spruce and covered with Haskelite three-ply mahogany, metal is used entirely. The tail skid is of chrome molybdenum tubing, heavily gusseted and sprung with rubber cord. The fin is constructed of steel tubing in one unit, involving a thick section. In the structure of the rudder and elevators, sheet steel ribs welded to alloy steel torque tubes are employed, the movable surfaces being supported by rigid steel hinges. All metal surfaces in the wings are protected by Berry Brothers lionoil.

As already mentioned, the engine is a 90 hp. OX-5. The fuel supply is taken from the gasoline tank, situated in the upper wing center section, and the feed is, therefore, of the gravity type. Arrangements have been made in the design to replace the OX-5 by a 180 hp. Hispano Suiza or an air-cooled Wright Whirlwind engine.

The structural factors of the plane have been so arranged that no material alterations would be necessary in the event of these high-powered engines being fitted. In discussing this factor, the Hess Aircraft Company has supplied the following comparative figures of safety and load factors. It will be seen that the Hess specifications are in all cases higher than

the requirements under the new civil air requirements of the Department of Commerce:

	Government Specifications	Hess Specifications
High incidence	6.5	8.5
Low incidence	4.5	6.5
Reverse loading	2.5	3.5
Fuselage load factors	6.5	7.0
Horizontal tail surfaces and aileron	30 lb. per sq. ft.	35 lb. per sq. ft.

Specifications

The general dimensions and details of performance, as supplied by the manufacturers, are given in the following table:

Span, upper wing	33 ft., 4 in.
Span, lower wing	30 ft., 6 in.
Chord, top and bottom	5 ft.
Gap	5 ft., 4 in.
Aspect ratio	6
Stagger, positive	12 in.
Dihedral, top wing	none
Dihedral, bottom wing	3 deg.
Airfoil section	Clark Y
Total wing area	300 sq. ft.
Overall height	9 ft., 2 in.
Overall length	23 ft., 6 in.
Weight, light	1,275 lb.
Weight, loaded	2,050 lb.
Wing loading	6.8 lb. per sq. ft.
Maximum speed	95 m.p.h.
Minimum flying speed	42 m.p.h.
Fuel capacity	30 gal.
Radius, maximum speed	340 mi.
Initial climb	400 ft. per min.
Service ceiling	13,000 ft.

Wright Develops High-Powered Radial Engine

A new aircraft engine, the Wright R-1750, to be known as the Cyclone, has just been produced by the Wright Aeronautical Corporation, of Paterson, N. J. Few details are at this time available concerning this engine for it has been developed by the Wright company for the Navy Department. Like the well-known Wright Whirlwind engine, the new Wright Cyclone is a nine-cylinder radial air-cooled power plant of 525 hp. It has recently completed the regular Navy 50 hr. type test at Paterson under Navy supervision. During this test it was not found necessary to make a single replacement of any consequence and it is understood that the Navy engineers, as well as the Wright company's own technical staff, are extremely pleased with the performance of the new engine. It should be recalled that this 50 hr. type test involves the last five hours being run at full maximum throttle and it is hardly necessary to point out how stringent a test this is of any engine. Rated at 525 hp., the Wright Cyclone is the highest powered radial air-cooled engine developed to the stage of passing the official Navy test or any similar test either in this country or abroad. In keeping with the Navy's policy of fitting its aircraft with air-cooled engines, the Cyclone fills an important place in the high-powered class.

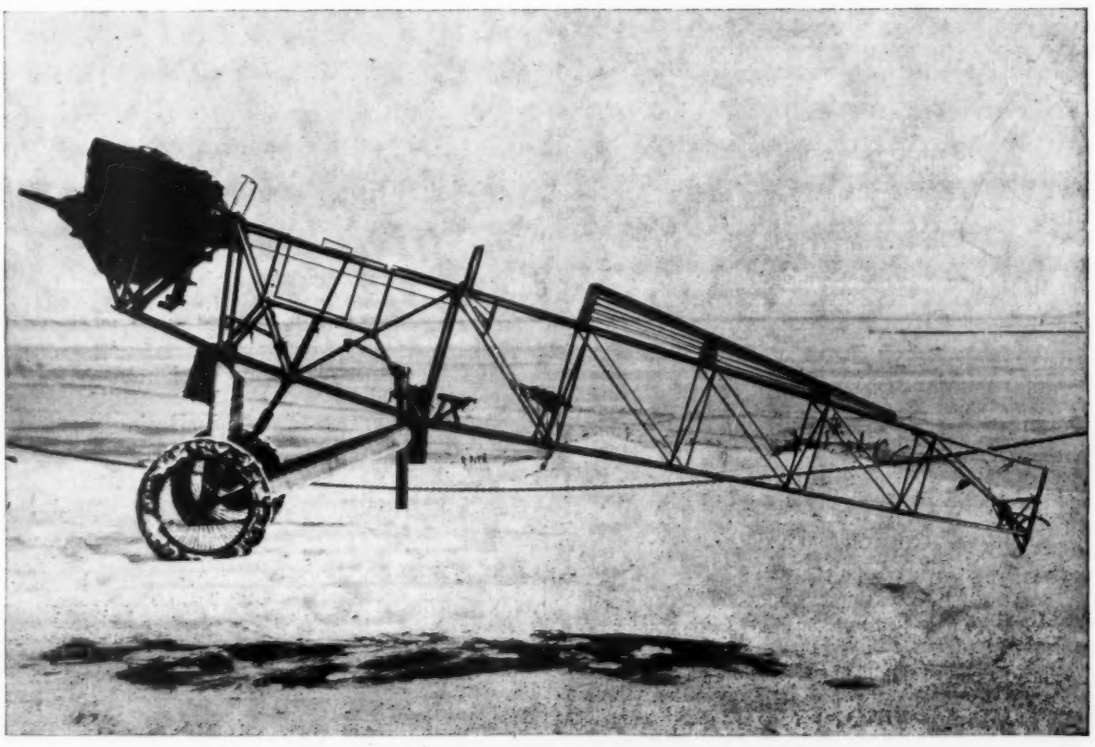
The New 20-Cent Air Mail Stamp

A new 20-cent air mail stamp was placed on sale at the New York and Washington post offices on Jan. 25 and will be available at other offices as soon thereafter as possible. For the benefit of philatelists it will be available on the same date at the Philatelic Agency, Division of Stamps, Washington, D. C.

The necessity for the issuance of the stamp arises from the new rate of air mail postage of ten cents a half ounce for the transportation of mail over all airlines in the United States, effective Feb. 1, 1927.

Existing stamps of the 8, 16 and 24-cent denominations used under the present cumbersome zone system of air mail postage on the Trans-Continental route, will be recalled. The 15-cent air mail stamp, now used on mail traveling over one zone of the Trans-Continental route and over one contract line will be retained until the supply is exhausted. Two of these stamps may be used under the new rate to cover postage on pieces of mail weighing one and a half ounces.

The new stamp is the same shape and size, 75/100 in. by 1-84/100 in., as the current 10-cent and 15-cent air mail stamps and is printed in green. The central design represents a map of the United States, showing some of the rivers and mountain ranges. On each side is an airplane in flight, one traveling East and the other toward the West. Across the top of the stamp in white Roman letters are the words "United States Postage", with the words "Air Mail" directly beneath. At the bottom of the stamp, in shaded letters, is the word "Cents", and in both lower corners are the white numerals "20".



A general constructional view of the fuselage of the Hess Blue Bird

The Navy Calls for Airship Designs

Designs for Two 6,000,000 Cu. Ft. Rigid Airships Called for in Competition. Originalities in Design Encouraged.

DESIGN DATA and bids on the construction of rigid airships of approximately 6,000,000 cu. ft. volume, suitable for use as adjuncts of the fleet, are being requested by the Navy Department in a competition which will close at midnight, May 16, 1927. Designs and bids will be received on one or two rigid airships complete, or any separable parts. Competitors must submit with their designs, a price for which such designs, either complete or special features of it, will be sold to the Government. The designs will be submitted to a board appointed by the Secretary of the Navy.

Two rigid airships were authorized by Congress in the five-year building program which went through last session. However, in the event that appropriations are not made for airship construction by the time the competition is ended, the Secretary of the Navy will consider the purchase outright of the winning design at a price not to exceed $50,000.

Requirements of Competitors

The Navy Department has specified that the airships must be constructed in the United States and only citizens or corporations of which not less than ¾th of the capital stock is owned by citizens of the United States, and of which the members of the boards of directors are citizens of the United States and have manufacturing plants located within the continental limits of the United States will be eligible to be awarded any contract under the terms of the competition.

These airships are intended primarily for scouting at sea, and one of their most essential characteristics must be a large radius of action. They will be capable of carrying machine guns, and adapted for carrying, attaching and detaching in flight several airplanes. While they are to be designed primarily for the use of helium, the possibility of using hydrogen gas or a combination of helium and hydrogen must be considered in the construction of the interior of the ship.

The gas volume of the airships must not exceed 6,500,000 cu. ft. with an overall length not more than 780 ft., overall height not more than 155 ft., and the overall width not more than 135 ft. The airships must have a cruising speed of not less than 70 knots when flying at an altitude of 3,000 ft. through calm air, and an endurance of not less than 130 hr. at a cruising speed of 50 knots.

Scope Permitted in Designs

The competitors in the design competition may use any form of hull or type of hull structure they desire, the only requirements being that they must show by data submitted that the form of the hull is satisfactory aerodynamically and that the hull structure is capable of withstanding the stresses induced in it by the various gravity weights such as power plant, fuel, ballast, crew, etc: the stresses induced by the buoyant gas; and the aerodynamic and other stresses which will be present under various conditions in flight including stresses induced by power plant arrangements and propeller thrusts and stresses which may be induced while the airship is moored or while it is being handled on the ground. The control system employed may be of any type desired by the designer.

The designs for the interior must include means of sub-dividing the buoyant gas, either through the use of containers or by other means, so that a rupture of one container will not entail gas losses from other containers. There must be not less than twelve gas containers or compartments, each compartment being provided with one or more automatically opening gas valves. Hand operated valves are to be provided at the top of the compartments, but not necessarily at every compartment, of sufficient total discharge capacity to permit one per cent of the total gas volume of the ship to be discharged per minute.

The specifications for the outer cover require that it will be taut, durable, weather-resistant, and fire-resistant, and of a type which will not absorb moisture from the atmosphere.

The control cabin is to be located so as to provide the best possible combination of all around vision in the air and while landing. The airship must be provided with suitable accommodations for the officers and crew. Provision for ten officers and thirty-two men is considered sufficient.

The number of main engines for the new airships may vary from four to twelve, but not more than two engines can be placed immediately adjacent to each other in any location on the ship. The number of propellors must not exceed twelve nor be less than four.

The conventional disposition of the engines of rigid airships in cars suspended from the hull by struts and wires, is considered by naval experts to be open to the objection that the cars add considerably to the total resistance of the ship, and in case of a crash, the personnel in the cars are in greater danger than if they were in the hull. As the use of helium has so largely eliminated the fire danger within the hull of a ship, it is considered safe and desirable to place the engines within the hull, provided a sufficiently light and reliable drive from the engines to propellors can be obtained.

Another desirable feature for an airship is the provision of means for obtaining vertical thrust, both up and down, to assist in taking off and in landing. The type of power plant proposed by designers must be adapted to the use of water recovery apparatus.

Special consideration to arrangements, fittings and gear to facilitate the mooring of the airship to a mast, or landing the ship on the ground, and moving it in and out of a shed must be given by designers.

The radio equipment will be installed in a separate compartment. The set must have a sounding range of 2500 miles, and radio compass equipment will be required in the radio equipment. For purposes of the competition, the radio outfit may be assumed to weigh 500 lb. and to occupy 150 cu. ft. The largest dimensions, exclusive of compass coils, cannot exceed six feet, and the radio compartment is considered to require approximately 1000 cu. ft.

Six features have been listed by the Navy Department and the attention of competitors is called to them, though it is not certain that any or all of them will be included in the design:

1. Provision for making the control cabin detachable and for making it and any other similar appendages watertight to the extent that they may float in water.
2. Provision for muffling the engines.
3. Provision for heating the control cabin and living spaces in the airship.
4. Protection for fuel and oil lines against freezing.
5. Installation of a photographic laboratory.
6. Use, or partial use, of suitable combustible gas as fuel.

Feature Points in Design

Each design submitted to the Navy Department will be judged on the following fifteen points or items. Percentage ratings are assigned to each item:

ITEM	PERCENTAGE
Ratio: gas volume/weight empty	15
Ratio: gas volume/air volume	5
Factor of safety in heavy and light conditions. Minimum 2.50	5
Factor of safety in extreme conditions. Minimum 2.00	5
Cruising radius at full power and at 50 knots	15
Maximum speed at 3,000 ft. altitude	10
Endurance of power plant and facility of attendance in flight	5
Accessibility of structure and gas compartments in flight	5
Economy of construction and facility of repair	5
Subdivision of gas space	5
Economy of buoyant gas in respect to leakage and valving	5
Ease of aerodynamic control	5
Facility of mooring, landing and handling on ground	5
Safety from fire and other accidents	5
Refinement of detail	5
	100%

Side Slips

By ROBERT R. OSBORN

The newspapers printed long articles recently, announcing that the Navy Department was opening competition for designs and bids for new types of rigid airships. The principal data which must be considered in the design was also given in the articles—cruising speed of not less than 70 "knots per hour", overall dimensions not to exceed 780 by 155 by 135 ft., gas volume not to exceed 6,500,000 cu. ft., and so on. Although we read all of the articles very carefully, we could find no mention that the ships must be equipped with kitchens capable of serving at least a seven course dinner. In spite of our calling attention to the fact that the British are building an airship now which has equipment on board for serving a seven course dinner, the Navy officials choose to disregard this all-important item. Suppose a war should pop up on us unexpectedly? The citizens would be very much surprised to find our armament limited to dinner-pail airplanes and cafeteria airships, and they won't be able to say that we didn't warn them about it.

However. this may all be part of the President's policy for the limitation of armament—he may even have a Committee for Limitation of Course Dinners Aboard Aircraft—and if this is the case, we'll take it all back. We do think, though, that the other nations should be held to the 5-5-3 course ratio.

* * * *

While we are still on the subject of airships, we take the liberty of passing along an apropos comment expressed by a writer in "Life" magazine—"If the next dirigible isn't named 'San Francisco' and isn't bigger and better in every way than the Los Angeles, the northern half of California plans to secede from the Union and annex itself to Japan."

The promise of a good race between a privately-owned, especially-built Fokker monoplane, and Navy planes, to be the first to make a non-stop flight to Hawaii, assures some excitement for the future. It is hoped that the San Diego Chamber of Commerce, in backing the flight, has in mind only an interest in promoting aviation or a little advertising for the home town. There are quite a few cities where, if the officials should show an interest in an airplane capable of providing them with reliable rapid transit to distant parts unknown, the opposition party would demand that the city accounts be audited.

* * * *

The papers state that "hovering tankers" or flying filling stations will shortly be put into operation on some European airlines, permitting refueling without landing. Experiments along this line have been going on for some time over here too, but the actual placing of this type of plane into commercial use will probably have a considerable effect on aircraft architecture of the future. In a very few years the automobile filling station blossomed from a barn with a few pails in front into the present-day Grecian temple with uniformed attendants to minister tenderly to the car's needs. So, it may not be long before the beautiful air yacht, we see passing by, will be only a wandering filling station on the look-out for the flivver airplane in need of another gallon of gas.

* * * *

We had only a few moments to inspect the flivver airplane exhibited by Mr. Ford at his New York show rooms, but one shortcoming in the design is immediately apparent—the machine is only single place. Flivver psychology, in the air as well as on the ground, requires that the owner shall be able to take Uncle Abner out for a run—to show him that the lightplane can pass all the higher priced planes on the steep climbs.

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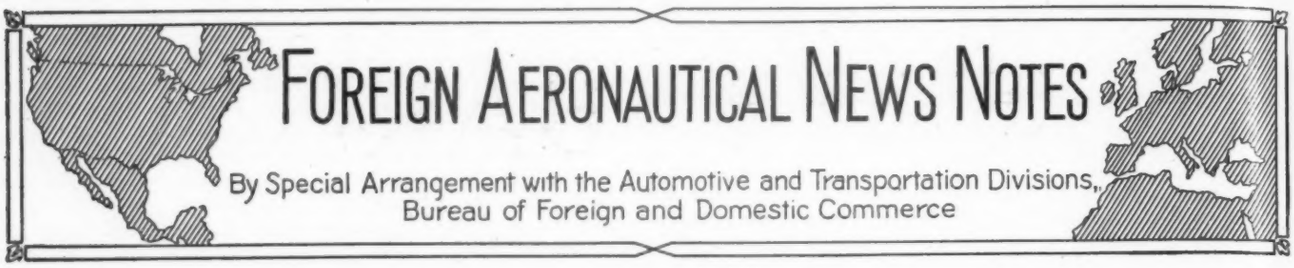
FOREIGN AERONAUTICAL NEWS NOTES
By Special Arrangement with the Automotive and Transportation Divisions,
Bureau of Foreign and Domestic Commerce

Air Passengers Buy Insurance With Tickets

By an arrangement entered into by the Deutsche Lufthansa and the Stuttgarter Versicherunge-Verein (Stuttgart Insurance Corporation) all passengers in commercial airplanes of the former company are insured to the amount of 25,000 reichsmarks, or about $5,950. The insurance is termed automatic, in that it involves no special expenditures or formalities on the part of the air passenger, the insurance fees being included in the price of the ticket.

The policy covers any injuries sustained by a passenger, or death, as a result of an accident on board of a plane, or by the crashing of the plane in which he is a passenger, including any injuries which might be incurred in entering or leaving the vehicle. Injuries or death occurring while en route to or from airdromes are also included in such insurance, if such transportation is supplied by the aviation companies.

In the event that a passenger is killed in an accident, his heirs or legal representatives receive 25,000 reichmarks. The same amount is paid to a passenger in case of permanent disablement. If a passenger becomes ill or temporarily disabled as a result of injuries sustained in an accident, he is entitled to a payment of 25 reichmarks for every day he is prevented from following his profession.

Additional insurance may be taken out at any office of the Lufthansa or its affiliated companies, as well as at all agencies for these companies, by signing an application therefor.

The lowest amount of additional insurance which may be taken out is 5,000 marks (5,000 death, 5,000 disablement, 5.00 daily); the maximum is 100,000 marks (100,000 death, 100,000 disablement, 100.00 daily).

No automatic insurance is granted on passengers' baggage and freight; insurance must be arranged for beforehand at the rate of one mark per thousand. The policy covers all risks (explosion, fire, destruction, theft, loss, etc.).

On the route to London, which is operated jointly by the Deutsche Lufthansa and the Imperial Airways, automatic life insurance is only granted on German airplanes. On British planes, passengers are insured by British underwriters, the premium being two shillings sixpence for each £50.00.000 Sterling of insured risk. The terms are similar to those inaugurated by the Germany company.

The Lufthansa states that the insurance company is doing a very satisfactory business under this plan, owing to the small number of accidents which have occurred since the inauguration of this insurance system.

Argentine Decree Regulates Civil Aviation

The regulation of civil aviation in Argentina was established recently by the promulgation of an executive decree. The regulations affect the ownership and operation of airplanes, the licensing and qualifications of pilots, the conduct of aviation schools and similar matters.

Unofficial reports on the provisions of the new regulations state that they are extensive and precise, and begin by classifying the airplanes for state, public transport, tourist and experimental purposes. Chapter 11, according to these reports, deals with warrants and licenses for civil pilots of airplanes and hydroplanes, which are divided into three classes. The first class civil pilot license gives the right to carry passengers, the second class license gives a right to render service in public transport line, and the third one gives the right to make individual tourist flights without passengers.

The warrants are to be granted by the Direction of the Air Service of the Army, and by the Jefetura del Servicio Aeronautico Naval.

The title of military pilot and pilot of hydroplanes are equivalent to second class licenses, those of military aviator and pilot of hydroplanes are equivalent to second class licenses and those of military and naval pilot aviator to first class licenses. No person may direct an air school without authorization from the Servicio Aeronautico del Ejercito or the Jefetura Aeronautico Naval.

For the civil pilot of the third class, the candidate must be eighteen years of age at a minimum, have practised, for at least eight hours instruction with double command and three hours of practice flying alone, and a similar examination to that demanded by the Aero Club Argentino at present.

For second class pilot the candidate must be nineteen years of age at a minimum, possess a civil license of touring airplanes with authorization of at least six months past, have effected as a minimum ten hours flight over the country, and pass an examination.

For first class civil pilots the minimum age of the candidate is twenty-one years, they must have a second class license for at least a year previous, and must show proof of having effected twenty-five hours flight in the last year. He must also pass a practical examination.

The licenses of airplane civil pilots shall be granted by the Aero Club Argentino, visaed by the Department of Civil Aviation of the Aeronautical Service of the Army. This license recognizes ability to effect ascents and journeys with passengers in airplanes of any size.

Detailed specifications are then given of the examination to secure the title of pilot of airships, also divided into three categories.

In the third chapter the formalties required for the use of lighter-than-aircraft are established, the principal one being that for the purpose of obtaining the qualification of one of lighter-than-aircraft are established. The principal one is that in qualifying for one of these it is necessary to submit it to an examination and have it inscribed in a special registry.

The conditions of the airdromes, and the air traffic within these or in their surroundings, are the object of very severe rules, as likewise the flying of airplanes arriving or leaving the Argentine territory.

Danish Air Traffic Operations During 1926

The operations of the Danish Air Traffic Company, during the 1926 flying season, as compared with 1925, were as follows: Kilometers flown, 1925, 204,417; 1926, 203,954; number of passengers carried on the regular routes, 1,128 and 1,032; number of passengers carried on pleasure flights at Copenhagen, 3,304 and 954; goods and baggage carried (kilograms), 17,126 and 26,803; mail carried (kilograms) 2,639 and 1,079; total weight carried on regular routes (kilograms), 107,005 and 107,380; regularity of traffic, to Hamburg 98.6 per cent; to Cologne, 95.0 per cent. This company maintains connections between Copenhagen-Hamburg and Copenhagen-Cologne.

The decrease in the number of passengers carried is due to delay in the delivery of new planes purchased by the company, but lack of confidence on the part of the public in the new equipment is also believed to have been in part responsible for the decrease. Besides the service maintained by this company, air line connections with the continent were maintained during the season by both a Swedish and a Dutch company.

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AIRCRAFT DESIGN COMPETITION

In order to encourage the development of aviation and to improve the efficiency of naval aeronautical material, as contemplated by Act of Congress, Public No. 446, approved July 2, 1926, the Secretary of the Navy invites the submission in competition, by sealed communication, of designs for rigid airships or approximately six million cubic feet volume, suitable for use as adjuncts to the Fleet.

Prospective competitors will be furnished identical specific information as to the conditions and requirements of the competition and as to the various features to be developed, together with the respective measures of merit that will be applied in determining the merits of the designs submitted in competition. While the competition does not contemplate that a design of a structure as complicated as an airship shall be completely worked out, it does require that, for a design to receive consideration, competitors must submit sufficient drawings, calculations, supporting data, and weight estimates to permit intelligent analysis and appraisal of the merit of the design. It will not be sufficient for a competitor to submit a few words or sketches descriptive of an idea.

The competition anticipates the placing of a construction contract with the winner of the competition, *provided funds are available by the time the competition is ended.* In any event, the sum of $50,000 is available for the purchase of a winning design. The airships must be constructed in the United States.

All designs and accompanying data must be placed in the mails not later than midnight May 16, 1927.

Information will be furnished upon application to the Bureau of Supplies and Accounts, Navy Department, Washington, D. C.

CHARLES MORRIS
Paymaster General of the Navy.

AIRPORTS AND AIRWAYS

Detroit, Mich.

A unique organization has been founded in Detroit. It is to be known as the Modern Parachute Club, and its purpose is to encourage the use of modern chutes and discourage the use of obsolete types.

The club has six charter members, five of whom have had the prescribed course for parachute riggers of the Army and have made from three to one hundred jumps.

Members will be competent to fold, test and repair parachutes for anyone in the locality and a course of instruction in rigging will be given. No one will be permitted to perform any work on a parachute except graduates of the course for parachute riggers, now given by the Air Corps, at Chanute Field.

The club will purchase several parachutes soon for the purpose of instruction.

Gainesville, Ga.

A sign, 110 ft. by 12 ft., with letters ten feet high, bearing the words Gainesville, Ga., has been painted on the roof of the main factory building of the Gainesville Cotton Mill, as a guide for fliers. The Pacolet Mfg. Co., of New Holland, Ga., has also completed a sign of the same size as the Gainesville one. The letters of both these signs are white against a black background. N.E.S.W. also appears in the signs. New Holland is fifty-three miles Northeast of Atlanta and Gainesville fifty-five miles Northeast of that city.

Des Moines, Iowa

John M. Walton, who has taken at least 1,000 passengers on their first flight, has compiled some interesting facts regarding aviation in Des Moines. He estimates that every tenth man and woman in the city has already flown, making a total of 20,000 within a radius of fifty miles of Des Moines who have gone for a hop. Mr. Walton, who was a flier during the war, and is now a reserve pilot, finds that there are thirty men in the city who can fly a plane, ten men who have undergone the two week Army reserve training course every year, twenty people who own planes in the city and thirty in the rest of the state.

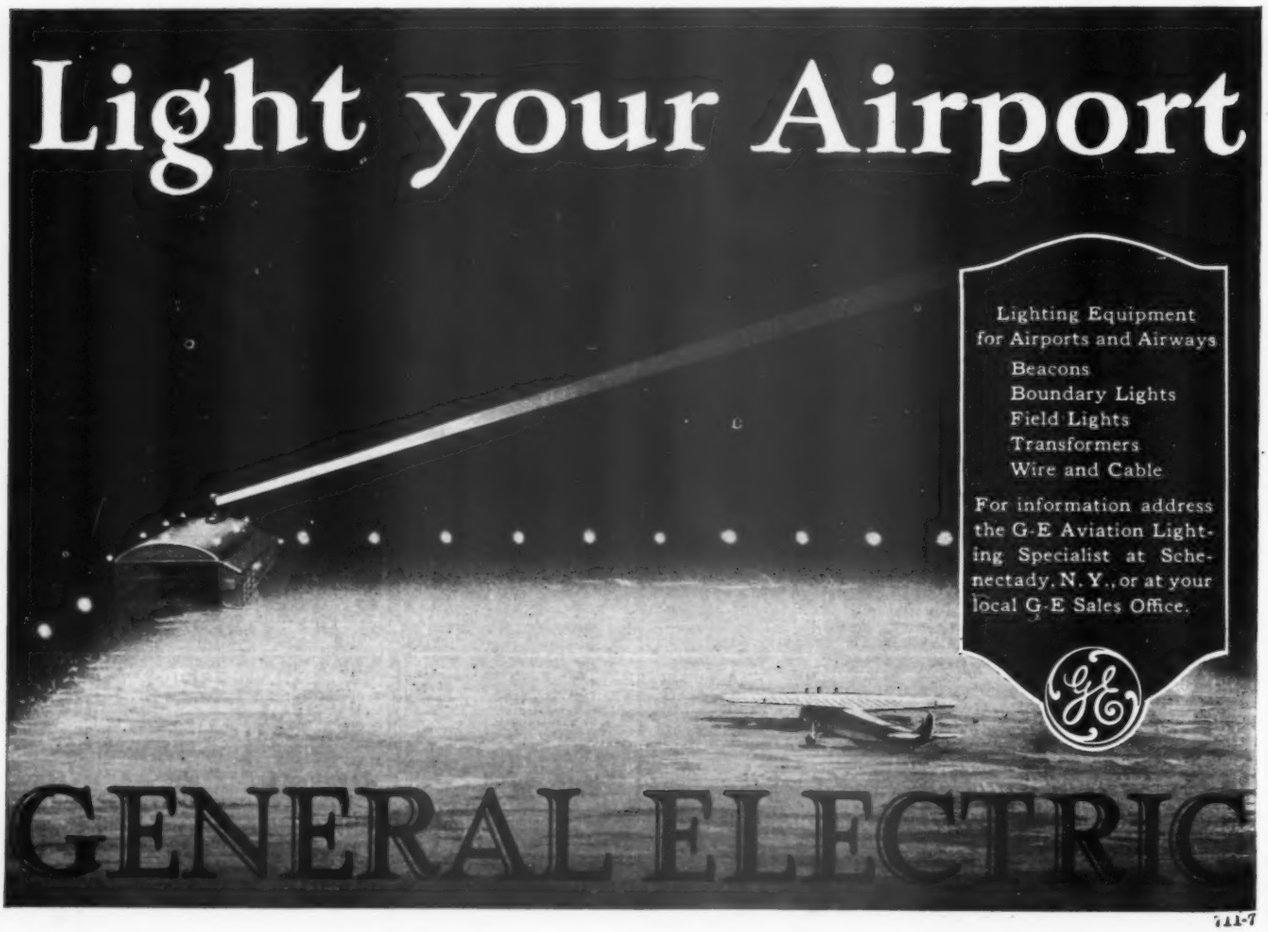
Mr. Walton, who is a director of the Des Moines chapter of the National Aeronautic Association, recently flew to Chicago in 4 hr., 27 min. He is also a state inspector of planes, appointed by the Governor.

It is Mr. Walton's belief that it is possible to land in Iowa from any point in the air with perfect safety.

Lordsburg, N. M.

Speaking before the Lordsburg Luncheon Club recently, Donald Wills Douglas, designer of the Douglas planes, told his audience that the field at Lordsburg ranked with the best in the country.

In sketching the progress of his company, Mr. Douglas said that five years ago it employed forty men and made one plane every two or three months. It now employs 550 people and turns out one plane a day.



Prior to Mr. Douglas' address, Lieut. Carl Cover, production manager for the Air Service of the West coast, spoke, complimenting the city on its airport.

Philadelphia, Pa.

The Ludington Exhibition Company who have operated the Pine Valley Flying Field for the past three years have recently moved into their new quarters at the Municipal Flying Field which they are operating under their new name the Ludington Philadelphia Flying Service, Inc. They have erected a large modern heated steel hangar which is supplemented with adequate shop facilities as well as store rooms, administration office, club house, etc.

They are equipping the field with complete flood lighting for night flying and are putting in all such facilities as will make this airport when completed one of the best equipped in the East. The field is only six miles from City Hall and with the service and equipment which the Ludington Company is preparing Philadelphia is assured of maintaining its prominent place in the aeronautical world.

Baron Eric Spulberch the well-known Belgian Army test pilot and "Bob" Hewitt the crack pilot of the Ludington Philadelphia Flying Service demonstrating a standard Waco 9 recently hopped off from the Philadelphia Municipal Field and in fifty-seven minutes were chatting with Sumner Ireland on Curtiss Field, Garden City, Long Island.

Little Rock, Ark.

The factory of the Arkansas Aircraft Co., which is now 100 by 150 ft., is being enlarged to permit completely assembled planes being taken in and out. While this work is going on, H. Morton Cronk, chief engineer, is designing a new plane for the company.

The field adjacent to the factory is being graded and cleared of obstructions, and it is believed that when this work is done the company will have a good field of its own.

Transit Company Will Use Service Plane

The Interstate Transit Company, which operates a line of Fageol safety buses between San Francisco, Cal., and Portland, Ore., has purchased a 200 hp. Fokker plane, which will be used as a service plane for carrying parts to the bus in case of breakdowns. It will be held in readiness in San Francisco at all times.

This service plane will not be used for passenger travel except in rare cases. In the event that a passenger who has a very important business engagement misses his bus, he will be rushed to the nearest landing field between San Francisco and Portland and placed aboard the bus.

Spokane, Wash.

Nick Mamer, pioneer commercial flier, has acquired the distributing agency for the new Swallow plane, for the Washington, Idaho and Montana territory. He operates from the municipal flying field under the name of Mamer Flying Service, and his headquarters are at his hangar, located on the field. Mamer has been operating a flying school and service in Spokane for the past seven years. During the Summer months he is chief pilot for the U. S. Forest Patrol, for District 1.

A complete flying and ground course is offered students at the school, and a passenger, taxi and general commercial service is offered the public. Swallow planes are used for this work.

The first carload of new Swallows, four of which are sold, is expected to arrive in Spokane about Feb. 1. Preparations are being made for a busy season, ten students are already enrolled with the Mamer Flying Service for the Spring training class. Ralph Sharpnack has been engaged as assistant instructor.

Dr. E. E. Langley, Flight Surgeon, Wesley Close and Penn Stohr have purchased Swallow planes from Mamer.

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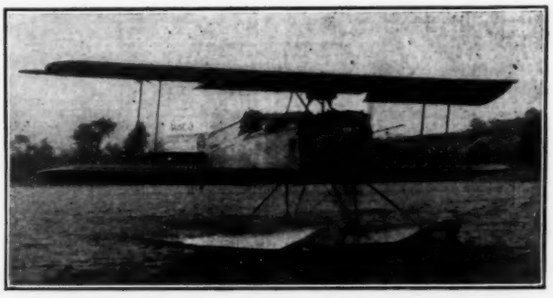

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UNITED STATES AIR FORCES

Will Rebuild Selfridge Field, Mich.

Selfridge Field, Mich., will be the first air field to be rebuilt under the War Department housing program. This field is situated at Mount Clemens, Mich., on Lake St. Clair, twenty-five miles from the city of Detroit. It was named in honor of Lieut. Thomas C. Selfridge, the first Army flyer to lose his life in an aviation accident. The field, comprising some 649 acres, was purchased by the War Department in 1921.

A total of $750,000 is to be expended on the first of the new construction.

Of this amount $570,000 will be used for the erection of barracks for enlisted men and $180,000 for quarters for married non-commissioned officers. The plans contemplate the construction of five two-story fireproof barracks to accommodate 735 men. Each building will contain dormitories, mess and kitchen facilities. The quarters for married non-commissioned officers will be two-story, two-family houses. Proposals for the construction will be under advertisement by the Constructing Quartermaster, Selfridge Field, at an early date so that the construction may be started as soon as weather permits. The organizations now stationed at Selfridge Field, are the 17th, 27th, 94th and 95th Pursuit Squadrons and the 57th Service Squadron. Collectively these constitute the first pursuit group of the Army Air Corps.

American Flier Flies Over Andes

Another American pilot has conquered the Andes, one of the World's highest and most perilous mountain ranges.

Flying from Buenos Aires, Argentina, Lieut. George T. Cuddihy, U.S.N., alighted at the Bosque Air Station near Santiago, Chile, Jan. 11. He used the same machine, a Curtiss Pursuit, in which Lieut. James H. Doolittle, U.S.A., flew from Santiago, Chile, to Buenos Aires last Sept.

Secretary Warner on Navy Aviation Procurement

Assistant Secretary of the Navy for Aeronautics E. P. Warner, addressing members of the Automotive Equipment Association, in New York City, recently, outlined the process of securing naval aviation equipment and spoke on the problems confronting the Navy and the manufacturer in developing material. Secretary Warner spoke of the factors which differentiate the purchase of Naval or military aircraft from ordinary purchase by private enterprise. Chief among these, he explained, was the requirement for a specialized product, differing from any design used for a non-military function.

Touching upon the Navy's first design competition, recently closed, Secretary Warner said that in the practical working out, the second alternative divides into three more. The manufacturer may submit a design which appears promising enough so that the Navy Department gives him a contract for building an experimental unit at government expense. He may, on the other hand, build the airplane at his own expense on speculation, with only incidental consultation with the department to make sure that its desires are being met, and submit it as a finished product, which will be purchased if satisfactory.

Secretary Warner told his audience that of all types of airplanes, fighting, bombing, observation and training combined, the Navy purchased 302 during the year ending June 30, 1926, and has planned for a total of 285 during the year coming to an end on June 30, 1927. For the fiscal year 1928, the appropriation bill as reported to and passed by the House of Representatives provides for only 155 new machines. The five-year program for naval aviation passed at the last session of the Congress and signed by the President, provided that at the end of five years there should be on hand 1,000 airplanes useful in war. Since the normal attrition of naval air equipment by destruction, or becoming obsolete and unfit for war-time use, hovers around thirty per cent, it will be necessary when the goal thus set is reached to adopt a standard rate of purchase of about 300 airplanes per year for replacement.

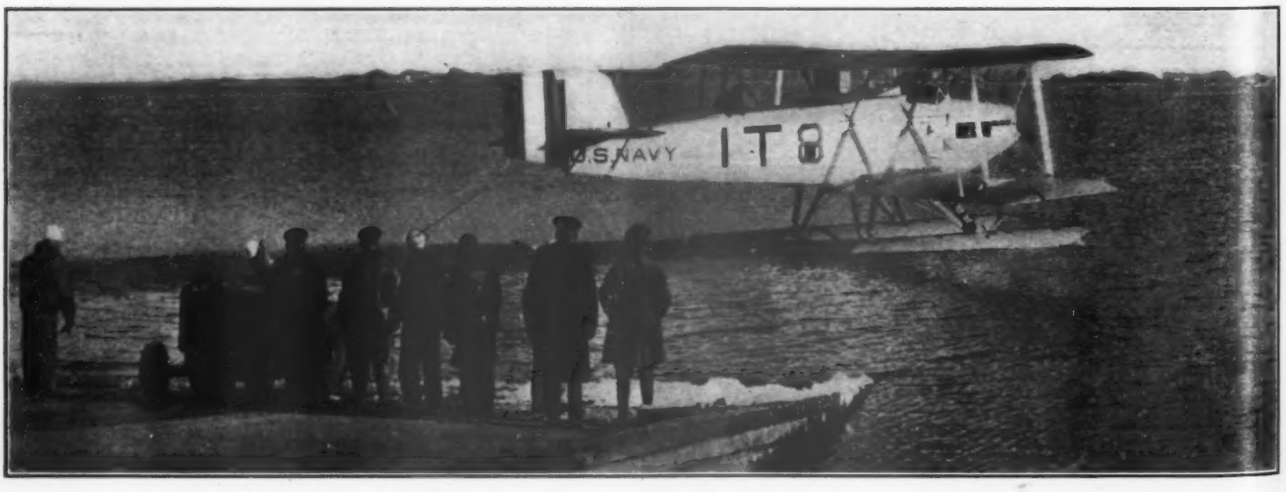
Flight Training For Enlisted Men

The Bureau of Aeronautics has announced that the next class scheduled for flight training at Pensacola will consist of approximately sixty-five enlisted men. The class is scheduled to assemble at Pensacola about Apr. 1, and is the largest yet attempted for the training of enlisted men.

The age limit for entrance is twenty-eight years and the physical requirements are exacting. These two factors cause the rejection of many applications and narrows the field for selection.

As the primary duty of a Naval aviation pilot is that of a plane captain, any previous experience the man may have had on the operating line and in the shops, where he was actually engaged in work on the plane and engine, is extremely valuable.

The Bureau of Aeronautics wishes to get as many men as possible, with experience in aircraft operation, into the classes for training at Pensacola. It is desired that every effort be put forth to insure the receipt of applications in time for consideration. Applicants who have no physical



The departure of one of the twenty-five Navy C S seaplanes, which recently left the Hampton Roads Naval Base for Guantanamo, where they will participate in the Winter maneuvers of the Atlantic Scouting Fleet, now in Southern waters. Comdr. A. H. Douglas is flight commander. The officer in the naval uniform with his back to the photographer is probably Comdr. A. C. Read, U.S.N., commanding officer of the Air Station at Hampton Roads, Va.

examinations on record cannot be considered, and all physical examinations must have been conducted within six months. In case of doubt as to the date of examination, and in all cases of eligible applicants desiring training, it is suggested that a new examination be conducted and a new application for training be submitted in order to insure consideration.

Navy Mechanics' School, Great Lakes, Ill.

Difficulty is being encountered in getting eligible applicants for training in the Navy Aviation Mechanics' School, Great Lakes, Ill. This school renders invaluable services.

Since it is desirable that all aviation personnel be as highly trained as possible, there is a tendency to examine a man's service record to learn how much he has done to prepare himself for his highly specialized work. There is a possibility that a notation on the man's record to the effect that he has successfully completed the course at Great Lakes will have much weight in deciding his fitness for advancement to chief petty officer rating.

It is desired that personnel be encouraged to take advantage of the opportunity offered for the training at the above school.

Major Brainard on Inspection Tour

Major E. H. Brainard, U. S. M. C., Chief of Marine Corps aviation, left Anacostia, D. C., at 8:10 a.m., Jan. 18, on an inspection trip, in a Curtiss pursuit plane, and landed at Pensacola, Fla., at 4:50 p.m.

The distance flown is about 900 miles, and one stop was made at Augusta, Ga., for lunch and refueling.

Obsolete Aircraft for College Use

The House has passed a bill (House Bill No. 12212), introduced by Representative Kelly (Rep.) of Edgewood, Pa., authorizing the Secretary of the Navy to dispose of obsolete aircraft equipment to accredited schools, colleges and universities.

The full text of the bill follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that the Secretary of the Navy be, and he is hereby authorized in his discretion to dispose of without charge, except for transportation and delivery, to properly accredited schools, colleges and universities for use in aeronautical courses, any aircraft parts, instruments, or engines which have been declared obsolete by the Navy Department; and provided that such aircraft, aircraft parts, and engines will not be used in actual flight.

Army Air Orders

First Lieut. Robert T. Cronau, Air Corps, Kelly Field, to New York City, sailing Apr. 1 on transport for Canal Zone.

Sec. Lieut. Roy Curtis Ploss, Air Corps Res., Brooks Field, to Berkeley, Cal., and on arrival thereat will stand relieved from further duty.

Sec. Lieut. Charles O. Wiselogel, Air Corps, Air Corps Prim. Fly. Sch., Brooks Field, attached for duty with Sec. Div., and will report to Com. Gen., Sec. Div., Fort Sam Houston.

Capt. Walter F. Parkin, Air Corps Res., Langley Field, to Walter Reed Gen. Hosp., Washington, for observation and treatment.

First Lieut. Russell L. Maughan, Air Corps, Kelly Field, detailed for duty with the Org. Res. Ninth Corps Area, assigned to duty with 104th Div., and will proceed to Salt Lake City, take station and report by letter to com. off. Lieutenant Maughan's name is placed on the detached officers' list.

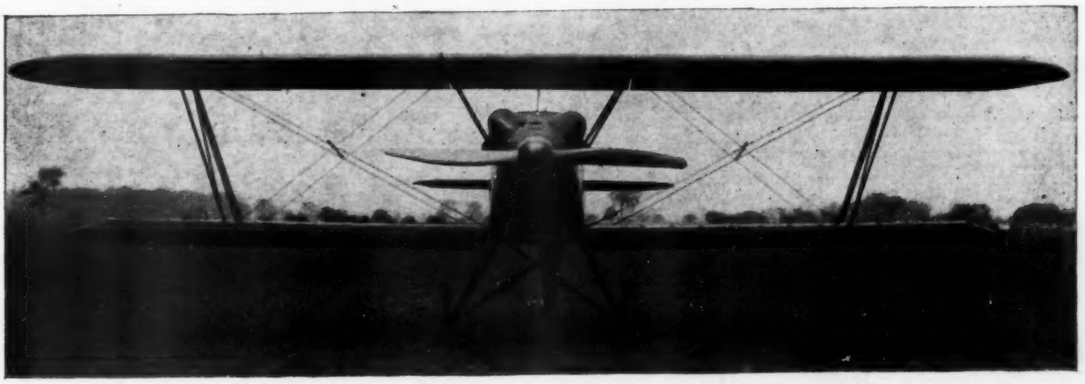
First Lieut. Jack C. Hodgson, Air Corps, relieved from assignment and duty, Brooks Field, and will report to com. gen., Air Corps, for training.

First Lieut. Harold A. Willis, Ord. Dept., is detailed in the Air Corps.

Navy Air Orders

Ens. Lester K. Rice det. Nav. Air Sta., Pensacola, to VF Squad. 5, Airef. Squad., Setg. Fleet.

The HESS BLUEBIRD



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Ens. John T. Shannon det. Nav. Air Sta., Pensacola, to VO Squad. One, Airef. Squad., Battle Fleet.

Ens. Raymond R. Waller det. Nav. Air Sta., Pensacola, to VJ Squad. One, Airef. Squad., Battle Fleet.

Ens. Rufus C. Young det. Nav. Air Sta., Pensacola, to VJ Squad. One, Airef. Squad., Battle Fleet.

Lieut. Comdr. Francis M. Maile det. com. VO Squad. 2, USS New Mexico, Airef. Squad., Battle Fleet, to Nav. Air Sta., Coco Solo, C. Z., as commanding officer.

Lieut. William Butler, jr., det. Nav. Air Sta., Pensacola, to VO Squad. 3, Airef. Squad., Setg. Fleet.

Lieut. Felix B. Stump det. VT Squad. 2, Airef. Squad., Battle Fleet, to Nav. Air Sta., Nav. Oper. Base, Hampton Roads.

Lieut. (jg) Rogers S. Ransenhousen det. Nav. Air Sta., Pensacola, to VO Squad. 6, Airef. Squad., Setg. Fleet.

Ens. Dale Harris det. Nav. Air Sta., Pensacola, to VO Squad. 6, Airef. Squad., Setg. Fleet.

Ens. Thomas J. Kirkland det. Nav. Air Sta., Pensacola, to VO Squad. 6, Airef. Squad., Setg. Fleet.

Ens. Joseph I. Taylor det. Nav. Air Sta., Pensacola, to VO Squad. 6, Airef. Squad., Setg. Fleet.

Ens. Myron S. Teller det. Nav. Air Sta., Pensacola, to VO Squad. 6, Airef. Squad., Setg. Fleet.

Navy Air Orders

Lieut. Myron F. Eddy det. Nav. Hosp., Annapolis, to VO Squad. One, Airef. Squad., Battle Fleet.

Lieut. Comdr. James M. Shoemaker det. VF Squad. Two, Airef. Squad., Battle Fleet, for duty in Design Sec., Bur. Aero.

Lieut. Comdr. Robert D. Kirkpatrick det. as Chief of Admins. Div., for duty as Asst. Nav. Attache, London.

Comdr. R. G. Pennyroyer appointed Chief of Admin. Div.

Lieut. Comdr. Robert R. Paunack det. Bu. Aero., Navy Dept., to USS Langley.

Lieut. Knefler McGinnis det. VS Squad. One, Airef. Squad., Setg. Fleet, to command VJ Squad. Two Airef. Squad., Setg. Fleet.

Lieut. Allan P. Snody det. Bu. Aero., to VO Squad. 6, Airef. Squad., Setg. Fleet, USS Arkansas.

Lieut. Comdr. Isaac Schlossbach det. command VJ Squad. Two, Airef. Squad., Setg. Fleet, to command VJ Squad. 5, Airef. Squad., Setg. Fleet.

Lieut. (jg) Delbert S. Cornwell det. VO, Squad. 6, USS Utah, Airef. Squad., Setg. Fleet, to VF Squad. 5, Airef. Squad., Setg. Flt.

Lieut. Stewart S. Reynolds det. N.A.S., San Diego, Cal., to USS Nevada.

Lieut. William L. Peterson det. USS Raleigh to VO, Squad. 5, Airef. Squad., Setg. Fleet, USS Concord.

Lieut. (jg) Addis D. Nelson det. VO, Squad. 5, USS Concord, Airef. Squad., Setg. Fleet, to VF Squad. 5, Airef. Squad., Setg. Fleet.

Lieut. Arthur W. Radford det VO Squad. One, USS Colorado, to VO Squad. One, USS Pennsylvania, Aircraft Squads., Battle Fleet.

Ens. Bromfield B. Nichol to Airef. Squad., Setg. Fleet. Orders Dec. 17 modified.

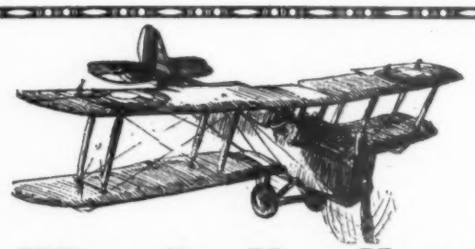
Lieut. William W. Davies det. Nav. Med. Sch., Washington, to Nav. Air Sta., Anacostia.

Lieut. (jg) Edward M. Harris det. Nav. Air Sta., Anacostia, to Nav. Med. Sch., Washington.

Change of Address

The Editorial and Publicity Offices of The Gardner Publishing Company, publishers of AVIATION, WHO'S WHO IN AMERICAN AERONAUTICS and THE AMERICAN AIRCRAFT DIRECTORY, are located at:

The Fisk Bldg., Broadway at 57th St.



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American Aircraft Directory

Many enquiries have been received by Aviators for information regarding state laws, municipal ordinances, commercial pilots, airports and aircraft operators throughout the United States. To meet this demand, the American Aircraft Directory will be published in 1927 in book form with many maps, illustrations and advertisements. As many of our readers wish this information immediately, there will be published each week, the data which has been received to date.

It is expected that many additions will be made and our readers are requested to send any corrections, additions or suggestions that they may have. Copyright, 1927 by Gardner Publishing Company.

LOS ANGELES
(Continued)

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Activities, flying instruction and general commercial flying. Address, 1220 W. 7th. St.

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Municipal Field. Address Frank W. McCarton or G. B. Leet, American Legion.
Location: ½ mi. S of town.
Description: 1,500 by 1,200 ft.; Alt. 200.
Facilities: Supplies available.

MONTAGUE
FLYING FIELD
Army Forest Patrol Field.
Location: ¼ mi. S of town.
Description: 1,800 by 650 ft.; Alt. 2,470 ft.; marked.
Facilities: All accommodations.

NEWMAN
FLYING FIELD
Canal Landing Field.
Location: 2 mi. W of town.
Description: 4,000 ft. N and S by 1,000 ft. E and W.
Facilities: Supplies available in town.

ONTARIO
Latimer Field, commercial.
Location: W of city.
Description: 5,280 by 700 ft.; Alt. 150.
Facilities: All accommodations.

PALMDALE
FLYING FIELD
Municipal Field.
Location: ½ mi. W of city.
Description: 1,800 by 600 ft.; Alt. 2,760; marked.
Facilities: All accommodations.

PASADENA
City ordinance regulating flying over city.
FLYING FIELDS
De Mille Field No. 3.
Location: SE of city.
Description: 800 E and W by 1,500 N and S; Alt. 780 ft.; marked.
Facilities: Hangars; supplies available in city.

Commercial Field.
Location: 3 mi. NE of city.
Description: 1,800 by 400 ft.
Facilities: All accommodations.

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FLYING FIELD
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Location: 1 mi. NE of center of city.
Description: 1,000 by 900 ft.; Alt. 20 ft.
Facilities: Supplies available in city.

RED BLUFF
FLYING FIELD
Forest Patrol Field.
Location: 1 mi. SW of town.
Description: 3,000 ft. sq.
Facilities: Supplies available.

REDDING
FLYING FIELD
Municipal Field.
Location: 1 mi. SW of courthouse with large dome.
Description: 2,000 by 1,000 ft.; Alt. 527; marked.
Facilities: Supplies in town.

REDLANDS
FLYING FIELDS
Municipal Field, Ray W. Johnson, 338 Orange St., manager.
Location: 1 mi. N of town.
Description: ¼ mi. sq.; Alt. 1,356 ft.; marked.
Facilities: Supplies and repairs available.

Redland Fields, operated by Chamber of Commerce.
Location: 1 mi. from machine shops.
Description: 600 by 1,400 ft.; marked.
Facilities: Supplies available.

REDWOOD CITY
FLYING FIELD
Redwood Aviation Field.
Location: N of town.
Description: 10,500 by 3,960 ft.
Facilities: Hangar; all accommodations.

RICHMOND
See San Francisco.

RIVERSIDE
FLYING FIELDS
March Field, government controlled. (Inactive)
Location: 14 mi. SE of city.
Description: 6,000 by 4,000 ft.; Alt. 80 ft.
Facilities: Hangars; supplies available in city.

Stewart Field, address L. P. Stewart, 678 W. 9th St.
Location: 1 mi. W of center of city.
Description: 2,460 ft. N and S by 300 ft. E and W; marked.
Facilities: Supplies in city.

ROSEVILLE
FLYING FIELD
Commercial Field, owned by W. B. Hawkins.
Location: 1 mi. S of town.
Description: 400 by 1,300 ft.; Alt. 200 ft.
Facilities: Hangars and supplies.

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FLYING FIELDS
Irwin Airport, commercial, address Irwin Aircraft Co.
Location: 4 mi. S of business section of city.
Description: 3,300 by 6,000 by 2,000 ft.; marked.
Facilities: Hangars and all accommodations.

Municipal Airport, in charge of F. N. Evans.
Location: 5 mi. from business section and 1 mi. S of large race track.
Description: 3,000 by 1,500 ft.; marked.
Facilities: Supplies available.

Mather Field, U. S. Air Service (inactive).
Location: 4 mi. SE of the American river.
Description: 6,400 by 4,300 ft.; Alt. 30 ft.; marked.
Facilities: All accommodations.

SAN CARLOS
FLYING FIELD
San Carlos Field, owned by Walter T. Varney.
Location: Adjoins city on W.
Description: 3,000 by 1,500 ft.; marked.
Facilities: Hangar; all accommodations.

SAN DIEGO
FLYING FIELDS
Rockwell Field, controlled by U. S. Air Service.
Location: On North Island, NW of Coronado Island, being SW of San Diego.
Description: About 4,000 ft. in any direction.
Facilities: Hangars, supplies, etc.

Municipal Field, temporarily operated by Ryan Airlines.
Location: ½ mi. from business section on San Diego Bay.
Description: 1,500 by 1,000 ft., irregular shape.
Facilities: Supplies available.

(To be Continued.)

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PUBLISHER'S NEWS LETTER

Back in an October issue of AVIATION in a news story that was sent to AVIATION, the impression was created that the Department of Civil Aviation of the British Government supervises the operations of Imperial Airways, whereas in fact, all the management, direction, policy and supervision of the operations of this air line are contained within the company itself and all data—technical, commercial and financial—is entirely free from any Governmental supervision. The Imperial Airways writes: "The supervision referred to in the article is doubtless the enforcement: (1) of the rules and regulations of air navigation which are analagous to the international law of the Mercantile Marine and which, in Britain, come under the Department of Civil Aviation, and (2) the enforcement of the technical regulations governing the safety of the aircraft itself which is not under the control of the Department of Civil Aviation but under that of the Departments of Technical Development and the Aeronautical Inspection. The ever increasing asset in the form of goodwill comprises the accumulation of technical data often referred to as trade secrets, which information is admittedly the property of the Company and is not sought by or given to any Government official or Department."

* * * *

Some years ago the suggestion was made that, to serve as a helpful guide to inspectors and engineers, a record should be kept of those features of airplane design, those kinds of material, those processes of fabrication, and those methods of assembly, which, in practical service, appeared to have been found to be safe and efficient, together with a record of those which appeared to have been found uncertain or bad.

With this thought in mind there was drawn up a skeleton framework upon which might be built such a record of observation of practice. The unhappy name "Handbook of Instructions for Airplane Designers" was given this document.

As time went on, Government officials, pressed by inventors and engineers in the industry for permission to incorporate new and untried ideas, and having at hand neither sufficient knowledge, nor time, nor facilities for the necessary research and experimental work to test these ideas, hit upon "The Handbook" as a convenient hatrack upon which they might hang their responsibilities. The easiest way to dodge the trouble of being held responsible for possible future accident was to say: "The Handbook says 'No' ".

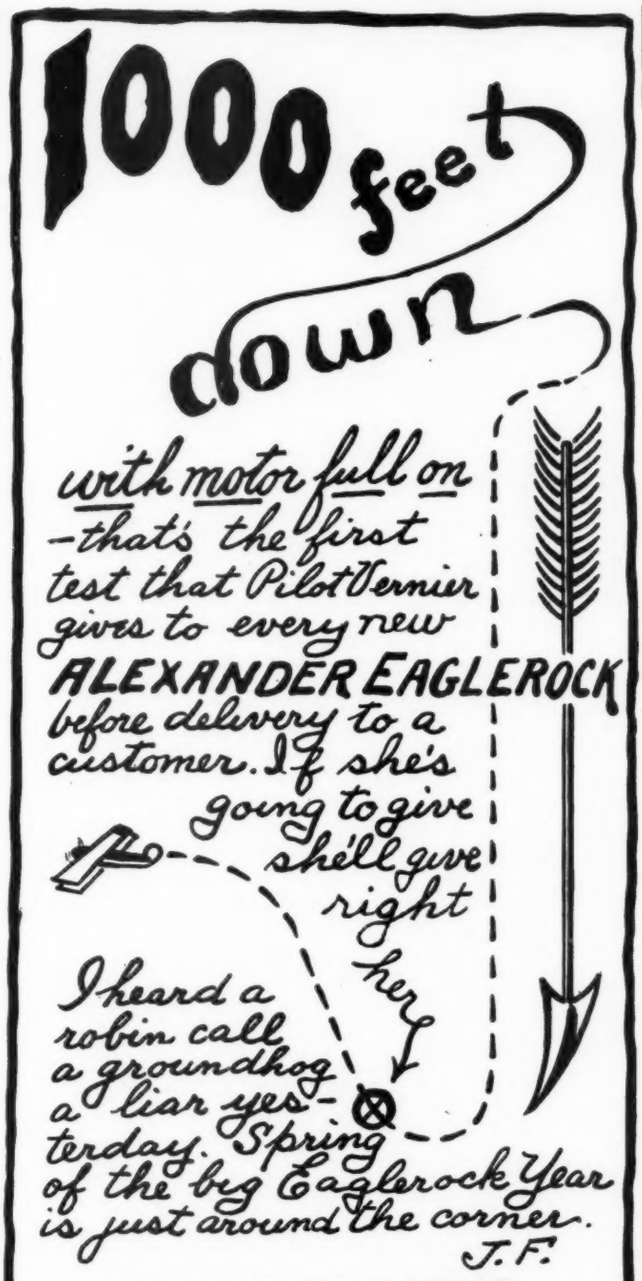
The words "shall" and "must" crept into the Handbook in many instances, unwarranted by the inexact knowledge of this new and complicated science. The Handbook, instead of a record, became a code of laws, almost as immutable as those of the Medes and Persians.

Let us try to avoid the danger of stifling scientific and engineering progress by urging the Department of Commerce, in their instruction books, to omit unjustified "shalls" and "musts". Let us give responsible officials discretion to encourage advances in efficiency, safety and reduction of cost.

On the other hand let us not, by forcing it at this time, write a lot of mandatory provisions in the Code and shoulder too much responsibility upon the infant department. Temporarily, at least, the manufacturer, who must be credited with some pride in his product and must realize that his business will surely perish if his airplanes are not proved safe in continued service, should be left some scope.

* * * *

The above was written before the regulations were given out and it is pleasing to note that in many respects they have been made very elastic. Therefore, if they can be kept in their easily changeable condition it will be very helpful. During the first few months of the operation of the new regulations, little can be said or done. So far as we have been able to judge, every effort has been made to place competent and experienced men in charge of the execution of the rules. No one could ask for more and if the spirit which Secretary MacCracken has exhibited throughout all the negotiations prevails in the inspections and issuance of certifications everyone will be satisfied. No new code can be expected to be perfect and many changes will have to be made, undoubtedly, as experience is gained. The great requirement at present is patience and co-operation on the part of all concerned.—L.D.G.



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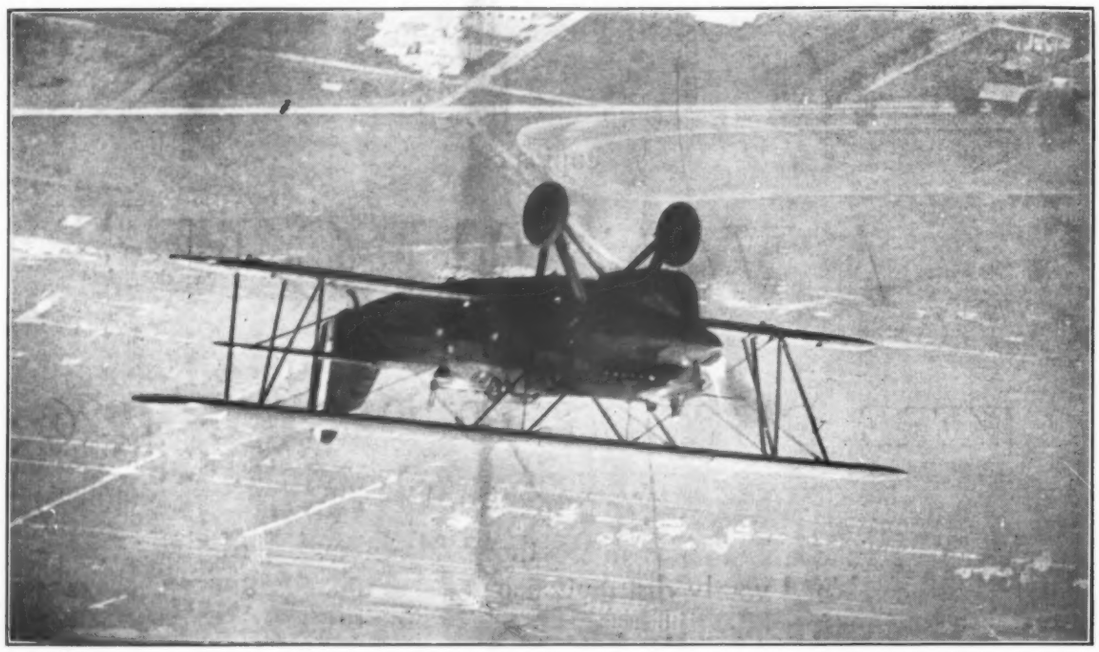

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